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CONTENTS.

EDITORIALS: PAGE.

Mr. R. P. Rothwell 317
The Utah Smelters and the Duty on Lead 317
Consolidation of Zinc-Producing Works in Southwestern Missouri... 317
The Operations of the Mints and Assay-Offices 317
Monetary Statistics of the World..... 317
A Recent English Treatise on Metallurgy 318

Letters from the West.—XI..... 318
The "Lime Process" in English Coal Mines..... 319
Official Statements and Reports..... 319
Notes on Copper Smelting..... 319
The O'Neill Hoisting-Engine Brake.... 320
The Silver Islet Mine and its Present Development..... 320
Lighting a Great City by Electricity.... 323
The Spontaneous Combustion of Bituminous Coals 323
The Advantages and Disadvantages of the Koepe Winding System..... 323

NOTES:

The Duty on Chemicals..... 324
The Wilson Gas-Producer..... 324
Statistics of Ameri an Industries... 324
The Canadian Phosphate Trade. 324

GENERAL MINING NEWS: PAGE.

Arizona..... 324
California..... 324
Central America..... 324
Colorado..... 325
Dakota..... 325
Georgia..... 325
Idaho..... 325
Maine..... 325
Mexico..... 325
Michigan..... 325
Montana..... 325
Nevada..... 325
New Mexico... 325
Utah..... 326
Wisconsin 326

Mineral Patents Granted by the United States Land-Office..... 326
Patents Granted by the United States Patent-Office..... 326

FINANCIAL:

Gold and Silver Stocks..... 326
Copper Stocks 328

METALS..... 328
BULLION MARKET. 330
IRON MARKET REVIEW..... 329
COAL TRADE REVIEW..... 330
STATISTICS OF COAL PRODUCTION..... 330
FREIGHTS..... —

Advertisers' Index x

FOR the time being, all personal communications to Mr. R. P. ROTHWELL should be addressed to No. 31 Boulevard Malesherbes, Paris.

THE agitation over the tariff, as affecting the duty on lead, seems to be spreading in the producing regions of the Rocky Mountains. The Utah smelters, like their rivals in Colorado, have called a meeting, and propose to discuss the best measures for defeating any reduction. This sudden change from apathy in summer to activity now will, we fear, do little good. How are they going to gather the facts which they must array as the basis of that appeal? The Committee of Ways and Means is rapidly working its way through Schedule A, the drugs and chemicals, and at the present rate of progress will soon reach the metal schedule ; and before any arguments can be brought to bear on its members, it will probably have framed its bill. The Western producers have only themselves to blame if they do not succeed. They gave no support to the Missouri smelters, and have never taken any steps to form an organization like that doing such good work for the iron and steel trades.

FROM St. Louis comes the news that negotiations are now in progress and nearly completed to consolidate a number of the zinc-producing works of Southwestern Missouri. The aggressors are said to be the Marsh & Harwood Company, which, it is said, proposes to buy the plant of the two Carondelet concerns, and is endeavoring to secure refusals of other furnaces. As yet no precise information as to the scope and area of this movement is at hand; but from the somewhat confused and wordy reports in the St. Louis newspapers, it seems that the object of the parties at the back of it is to introduce the manufacture of sulphuric acid from the sulphurous acid produced in roasting zinc-blende preliminary to distilling the zinc. Early in the summer, Herr FREDERICK BODE, a prominent German engineer, built a plant for this purpose for Messrs. HEGELER, of La Salle, Mo. Until this plant was erected, it was considered impossible practically to utilize the sulphurous acid generated in blende roasting. The rapid decline of the metal during the last month or two to 4·75 cents, or below the point where importations of foreign zinc are possible, gives color to the statement that this utilization of what was hitherto a waste product yielded a profit which made it possible to cut prices on the metal.

MR. HORATIO C. BURCHARD, Director of the Mint, has issued an annual report on the operations of the mints and assay-offices, which contains many figures of interest. The actual coinage during the year amounted to $89,413,457.50 of gold, $27,783,388.75 of silver, and $644,757.75 of minor denominations. During the same time, the mints and assay-offices received and operated upon $124,749,738.98 of gold and $35,507,877.09 of silver, of which $31,298,511.97 of gold and $30,956,588.18 of silver were of domestic production. The government establishments did even more parting and refining, above their requirements, than in past years, producing $12,775,753.94 of standard gold and $35,100,966.23 of standard silver. The mints and assay-offices have sharply competed with private refiners, particularly in San Francisco, and the price has been forced down considerably. Notwithstanding this, the expenditures were only $204,609.56, while the charges collected were $278,882. Mr. BURCHARD considers this a very satisfactory exhibit, because it shows that the refineries have been more than self-sustaining. Unfortunately, the details of the expenditures are not at hand ; but we doubt whether they include such items as the interest on cost of plant and real estate, and the many other figures which go to make up the expenditures of a private establishment outside of the mere cost of salaries, labor, supplies, and fuel. The government thus assumes the position of a favored competitor for the work of parting and refining bullion beyond its own requirements.

The mints purchased 23,627,229 standard ounces of silver, paying therefor $24,136,942.20, or an average price of $1.0215 per standard ounce, the average New York quotation being $1.02419. During the year, 27,772,005 silver dollars were coined, of which only $15,747,463 were distributed, thus swelling the amount of standard dollars in the mints to $35,365,672. Out of the total coinage to October 1st, 1882, of $126,029,880, only $34,007,011 in coin are actually in circulation. The total coin circulation is estimated at $500,882,185 gold, $290,002,703 being in private hands ; $119,144,780 of legal tender silver ; and $80,428,580 of subsidiary silver.

Mr. BURCHARD gives a series of very interesting monetary statistics of foreign countries, which, however, we can not follow in detail. The following tables on the total production in the world, of gold and silver, deserve to be put on record :

THE WORLD'S PRODUCTION OF GOLD.

	1879.	1880.	1881.
United States.....	$38,899,858	$36,000,000	$34,700,000
Russia.....	28,551,028	28,551,028	28,551,028
Australia.....	28,765,000	28,765,000	31,127,515
Mexico.....	989,160	989,160	989,160
Germany.....	257,865	232,610	232,610
Austria-Hungary.....	1,062.031	1,094,596	1,240,808
Sweden.....	1,994	3,323	3,323
Italy	72.375	72,375	72,375
Turkey	4,918	4,918	4.918
Argentine Republic....	78,546	78,546	78,546
Colombia	4,000,000	4,000,000	4,000,000
Bolivia.....	72.345	72,345	72.345
Chili.....	128,869	128,869	128,869
Brazil.....	1,003,546	893,887	741,694
Japan	466,548	466,548	466,548
Africa.....	1,993,800	1,993,800	1,993,800
Venezuela.....	1,615,855	2,274,692	2,274,692
Canada.....	815,089	815,089	1,094,926
Total.. 108,778,807		106,436,786	107,773,157

For silver Mr. Burchard makes the following estimate :

THE WORLD'S PRODUCTION OF SILVER.

	1879.	1880.	1881.
United States $40,812,132		$39,200.000	$43,000,000
Russia.....	473,519	473,519	473,519
Australia.....	227.125	227,125	227,125
Mexico.....	25,167,763	25,167,763	25,167,763
Germany.....	5,570,380	5,576,699	5,576,699
Austria-Hungary...	2,002.727	1,994,880	1,303,280
Norway....	184,360	184,360	184,360
Turkey.....	71 441	71,441	71,441
Argentine Republic	420,225	420,225	420,225
Colombia.....	1,000,000	1,000,000	1,000,000
Bolivia.....	11,000,000	11,000,000	11,000,000
Chili.....	5,081,747	5,081,747	5,081,747
Japan.....	916,400	916,400	916,400
Canada..	68,205	68,205	68,205
Total.....	96,172,628	94,551,060	97,659,460

It is not of course pretended that these tables are complete, as the repetition of the same items for the three years and other internal evidence show. The silver table especially does not even enumerate all the producing countiries. Peru, of course, has turned out very little silver during the last few years ; but we doubt whether it has entirely ceased. Great Britain turns out a moderate quantity of silver from native lead ores, and France produces silver in the same way, besides working considerable quantities of argentiferous lead from Spain and from Greece.

A RECENT ENGLISH TREATISE ON METALLURGY.*

The number of modern works on metallurgy is so small that it is a source of much regret that, with very few exceptions, they are of so little value to those for whom they are written. Unfortunately, we have no recent American treatises either on mining or metallurgy, and the student or the engineer who has become interested in some particular branch is forced, in the absence of any thing better, to turn to some of the volumes written by English authors. We have good reason to believe that few have escaped disappointment. Among the treatises we have been reluctantly forced to recommend because we knew of no better is one which has now appeared in the form of new, "revised, and enlarged" editions—Bloxam's Metals. We have naturally examined it with expectation, but must confess that we have hoped too much.

It is a very curious fact that, although there is hardly a branch in metallurgy in which progress has not been materially advanced by original and ingenious work in this country, the work done here is so much ignored abroad. Although we stand to-day first as the largest producers of steel, gold, silver, quicksilver, and lead, and probably of copper, in the world, and although we rank second only to Great Britain in the quantity of iron we manufacture, European metallurgists only too often seem to hold that they have all to teach and nothing to learn. The past ten years have taught English and continental iron-masters that we do possess a few knacks well worth knowing; but in the extraction of the precious and base metals they still occupy their assumed lofty position of unrivaled pre-eminence. Professor HUNTINGTON'S revised edition of BLOXAM is particularly striking in this respect. In his chapter on copper we do not find a line on the Hunt and Douglas, the Deutsch, or even the Henderson process. There is not even a reference to the Lake Superior stamping and washing machinery, by which this year fully 30,000 net tons of the metal have been produced. The only mention of the blast-furnace as an apparatus in use for melting copper ores is in connection with the Mansfeld process, and even then Professor HUNTINGTON illustrates a 14-foot "Brillenofen," replaced at Kinghuette more than twelve years ago by a blast-furnace, larger than many used for smelting iron ores. We have looked in vain for a word on the Hasenclever or Gerstenhöfer kilns, or on the use of the Siemens regenerative furnace for refining. Professor HUNTINGTON entirely ignores the efforts made to introduce the Bessemerizing of mattes or the application of electrolytic methods to copper extraction. In his chapter on lead, he informs his readers that at Clausthal the "galena is reduced by firing it in a small blast-furnace with granulated cast-iron." He shares the English preference for the Pattinson as against the Parker zinc desilverizing process, and seems to consider the main drawback of the latter the loss of zinc. His treatment of the metallurgy of silver is particularly brilliant and exhaustive. He gives nearly two pages to the obsolete methods of liquating and melting with lead argentiferous black copper, spreads over four pages on the Mexican amalgamation process, devotes as many pages to the Freiberg barrel process, has a few words to say on "Krölucke," and polishes off the "Washoe" process with seven lines! Let the American mine-men who fondly imagine that, after so many years of patient labor, they have developed something worth putting on record, read the following:

"Another process, which has been introduced to deal with similar kinds of ores in Nevada, Colorado, California, etc., is known as the Washoe. In this process, the ores are ground with water in iron pans heated by steam, and mercury is added. The sulphide of silver is decomposed by the iron, sulphide of iron being formed, and metallic silver set free, which is dissolved by the mercury."

In the chapter on gold we are told that in California the gold is chiefly alluvial, while in Australia gold quartz is more common. Professor HUNTINGTON speaks of the pan and the cradle; but he has evidently never heard of hydraulic mining, and if he had, would presumably consider it a local eccentricity, unworthy of attention. He has found out, however, that "when gold is disseminated through quartz or some similar rock, this must be crushed in order to extract the gold, an operation attended with great expense, on account of the hardness of the rock. Where it is possible, the rock is rendered more brittle by being heated to redness, and quenched with water." Professor HUNTINGTON, however, finds space to illustrate a fossil mill used in the Tyrol.

On iron and steel, Professor HUNTINGTON'S new edition is much better, as in this branch he seems to be sufficiently at home to keep fairly abreast of modern progress, although here, also, we note that he is by no means informed as to what is going on in this country. Nor is his treatment of the many branches of the iron and steel industry well balanced. The best chapter in his work is that on fuel, a subject which has been treated intelligently, and will be perused with much interest by American readers. It is the only part which is not absolutely worthless or so far behind modern treatises on the same subjects that it is useless.

On iron and steel it is completely eclipsed by the fifth edition, just issued, of BAUERMAN'S Metallurgy of Iron, a work closely modeled after PERCY'S great book. Mr. BAUERMAN is a close student of the metallurgical literature, not only of Great Britain and the continent, but also of this country. It does not quite reach our ideal of such a work, not being perfectly balanced; but it shows a desire on the part of the author to study the records of progress in other countries. Comparatively little that is out of date has been retained, and the appliances throughout reflecting the most recent practice are, at least, such as we should be likely to see at any time in plants doing good work. Americans will miss much that they would probably have gladly seen noticed in detail. But until some one of the many busy engineers capable of writing a work for Americans has found the time to fill a gap sadly needed, they will find Mr. BAUERMAN'S book the best. For data on recent work they will have to gather from the rich though scattered store of our own technical literature.

* METALS, their Properties and Treatment. By CHARLES LOUDON BLOXAM. New Edition, Partially Rewritten and Augmented by Professor ALFRED K. HUNTINGTON, King's College, London. London: Longmans, Green & Co. 1882. Pages 452.

LETTERS FROM THE WEST.—XI.

Special Correspondence of the Engineering and Mining Journal.

KINGSTON, NEW MEXICO—A NEW CAMP.

In the angle made by the Atchison & Topeka Railroad, as it runs almost north and south, to meet at Deming the Southern Pacific Railroad in its east and west course, nature has undoubtedly stored a vast amount of treasure. There is Silver City, with its Bremen mine, which alone for many years has had to sustain the reputation of New Mexico as a silver-bearing region against sneers and adverse criticisms. And in the same region, only thirteen miles from Nutt station, on the Atchison & Topeka, in the foot-hills of the Miembres Mountains, lie the famous Sierra mines, now exercising the faculties of the mining brokers of the East even more than their refractory ores are worrying the temper and tasking the skill of the superintendent at the mill.

It is but little more than a year ago that George Daly, then opening these mines, was killed, with a number of United States soldiers, within ten miles of his house. Beyond here westward, extend the foot-hills of the Black range, whose valleys, fertilized by the waters of the many-branching Perchas, were the very paradise of the Apaches. Mining operations, therefore, were effectually controlled by that doughty warrior, Victoria. A straggling adobe hamlet, Hillsboro', eighteen miles beyond the present Lake Valley, supported by placer mining, held its own; but the miner ran the gauntlet in passing thence to the Rio Grande. A little mud hut at the watering place between Lake Valley and Hillsboro' is said to have witnessed as many Indian murders as any in the Southwest. Beyond Hillsboro', the Apaches! Now one rides over Victoria's trail with safety, but with a certain suspicion that, were Victoria alive (and conclusive evidence of his death is lacking), he might prove a match for General Crooke, and resent our intrusion by wreaking on us his threat, which he is said to have fulfilled to the letter, that no white man should enter the valleys of the Perchas and issue alive. However, danger or no danger, the Black range and the foot hills swarm with miners; for thither is now directed the periodical miners' *rush*. These flittings are the miners' "change." They are to the Western prospector what the midsummer migration to the seaside is to the dwellers in the East—a form of dissipation involving a vast amount of expense, trouble, and discomfort, but which habit seems to have made as necessary to the one as to the other. The chief gainers from this fashionable restlessness in both the East and the West are the railroads, next the hotel-keepers in the East and the town-site venders in the West; for many a rumor which reaches the miner's ears and sends him on his wanderings is circulated by some shrewd speculator, who has located a town-site at the same time that he has manufactured a mining district.

The center of excitement in this new mining region of the Perchas is Kingston. It is a town but just eight weeks old. On September 20th, the first frame was erected. To-day, Main street, for half a mile in length, is lined with dwellings, and is laid out for fully a mile in building-lots. A kingly street in width as well as length is Main street, being fully one hundred feet wide. And in its center rise, here and there, noble pines such as any city would be proud to consecrate a square to. The houses which line it are more varied in architectural style than in any city in the Union. A few are wholly of wood, framed, sheathed, and shingled; with the square front, so dear to Western taste, with square doors and square windows and horizontal cornices. Others tell of the vandalism of their dwellers, who must have cut down many stately pines to erect their log cabins. But most are of canvas, in whole or in part—either tents supported on tent-poles, or canvas stretched on a balloon frame; or with wooden frame and walls and canvas roof.

Whoever selected the site had an eye for the picturesque. The long straggling town is built on a terrace, below which flows the southern branch of the Perchas. In the back-ground rises the jagged, snowy crest of the Black range. To right and left, shutting in the narrow valley, are low rounded limestone hills; while ahead, the view is closed by a pointed mountain of remarkable symmetry. And within this frame is a perfect park of beautiful trees—tall pines and sturdy oak, not the stunted growth of the hill-side. But the scene will soon be bereft of these beautiful accessories; for the picturesque must be sacrificed to necessity, and the nearest trees will be cut down for building and fuel.

The only active people in the town are the builders. The miners loiter about in groups, or hang around the bars, those mining exchanges of the West, bargaining for their claims with a few black-coated speculators, who reach a new camp almost as soon as the saloon-keeper himself. A steady stream of new-comers flows in. The well-to-do miner is arriving on his wagon, drawn by a pair of horses, and laden with tent and tools, and perhaps a wife and family. The poor prospector is trudging in beside his donkey, from which hang his pick and shovel, drill and hammer, blankets, wardrobe—in fact, all his worldly goods. But new as the camp is, all are not mining: some are already retreating, conquered by fate. A prospector, down on his luck, leads his *burros* up and down the street, labeled with conspicuous placards, FOR SALE. A shoeblack, who forewarns you that a shine costs fifteen cents by painting his terms upon his box, does not drive but drags a languid trade. But

a wagon lumbers in laden with a printing-press for this eight weeks' community.

As is the case in all Western camps, most of the booths and houses are devoted to drink. There are, saloon without concealment; hotel-saloon; grocery; saloons under every guise and disguise. But there are also some really good stores, some quiet lodging-tents, and a few miners' huts; for in one notable respect, a modern camp differs from the earlier in the presence of respectable women and tidy children. Bret Harte's *Roaring Camp* is a place of the past. And to this sobering element, though the gaming-tables are crowded every evening, and fiddles twang and pianos are strummed in many a drinking and dancing-booth, may be attributed Kingston's remarkable freedom from crime. Not a single death from intentional shooting has occurred.

Unlike most communities, one section of the people does not live upon the other. All here prey upon the prospectors scattered over every hill-side for many a mile around. In the whole district, there are probably not fifty miners working for wages. Most are prospectors locating claims, on which they never propose doing more work than will secure them. A few are miners whose claims yield an ore that can be shipped to a profit, and who have sufficient faith in the future of their property not to be afraid to dovelop it. But such temerity is opposed to the first principles of the genuine prospector, whose business it is to scour the hills, to cover every trace of mineral by a claim, to do a little work on each; if that little shows the claim to be valueless, to abandon it; if, however, that little reveals a good body of ore, to stop at once for fear the next blast should exhaust it. He reasons correctly that, as not one promising prospect in a thousand proves to be a mine, he would sooner sell his for what he can get and let some one else take the chances, than run the risk of proving it valueless. As yet, of the hundreds of locations made in this district, two only have shipped a considerable quantity of ore. But this is really a good record; for ore must run up into the hundreds to be worth packing to a road, hauling fifty miles to a railroad, and shipping to a distant smelting-works. And as always happens, to one mine which can yield such ore there are dozens which will yield in quantity ore of sufficient richness to be profitably treated on the spot when suitable reduction-works are erected. But as no tribute-works have yet been built here, there is more excuse for the prospector pursuing his habitual policy than in many another locality, where his inactivity is due wholly to timidity and distrust of his property.

The ore occurs throughout the region in limestone; and the deposits possess, therefore, the eccentric characteristics of such ore-bodies. There seem to be two classes of ore: one in which the silver is associated with lead, accompanied with more or less iron and manganese. The other is a quartzose ore, carrying sulphide and other compounds of silver. The most notable instance of the former class is the Iron King, where over about half the claim shallow pits expose a low-grade lead carbonate. In other mines, as the Andy Johnson and Illinois, the ore is less distinctly a lead ore; but yet carries enough lead, as does most of the ore of the celebrated Lake Valley mines, to remove it from the category of milling ore. The other class of ore is found in the Bullion, where from a vertical shaft seventy feet deep about $60,000 worth of 400-ounce ore has been taken; and in some interesting beds near Perchas, which have been very imperfectly explored. It was from this section of the district that came those wonderful lumps of sulphide of silver found as float upon a hill-side; one lump of which weighs over two cwt., assays 2330 ounces, and is worth, therefore, over $2500. Unfortunately, the source of this wealth is still hid, although some thousands of dollars have been expended in the search.

The region has been so lately discovered, and as absolutely no systematic work has been done on any of the mines, it is impossible to predict what its future will be; but it is already constituted a new mining district, and will doubtless soon make its appearance in the East in the person of mine operators offering their wares. J. D., JR.

KINGSTON, NEW MEXICO, Nov. 22.

THE "LIME PROCESS" IN ENGLISH COAL MINES.

There are few questions strictly technical in character which have been the subject of so much discussion in England by legislators, labor reformers, doctrinaires, and the general public as that of abolishing the use of gunpowder in fiery coal mines. The risk attending the firing of shots in workings in which fire-damp gathers in dangerous quantities, even at rare intervals, is undoubtedly large. But, on the other hand, colliery proprietors in certain districts in Great Britain claim, and sustain their position, that the abolition of the use of gunpowder would practically place them at the mercy of competing regions. The problem of breaking down the coal in some other manner has therefore always been studied with much interest, and the solutions presented for trial have attracted attention beyond the narrow circle of those immediately interested. Wedges and other devices have been proposed, and in Belgium and France a machine on the principle of the percussion rock-drill made by Messrs. Dubois & François for driving a bar into holes previously drilled has found some favor. The latest device, which has met with much encouragement, is the "lime process," as it is called. We have already described it at length from the English accounts received, and it is only necessary to say that cartridges of quicklime are introduced into holes drilled in the coal, and are moistened with water forced in by a pump. The slacking of the lime causes an expansion and a generation of steam, which breaks down the coal which has been previously undercut. From all the accounts which have reached us thus far, the fact could only be gathered that the slacking of such lime cartridges was actually sufficient to do the work, and that there was a fair prospect of the success of the method so far as its operation was concerned. Upon the vital point whether it would be possible to break down a given quantity of coal at a price approximately equal to that of the cost of blasting, we have had no details to guide us until lately. The first figures which may be claimed to possess any significance have just been published, and, so far as they go, they are certainly encouraging. They were presented a few weeks ago by Mr. Arthur Sopwith before the South Staffordshire and East Worcestershire Institute of Mining Engineers, and give the results of trials made at the Cannock Chase colliery. While these trials were not numerous, and while it was not possible to make all conditions equal, so that the cost of breaking down coal with lime and with powder do not exhibit their comparative merits with absolute accuracy, yet they are complete enough to warrant the conclusion that the new process is worthy of the closest attention, and will probably conquer a field of its own. How large this field will be, will naturally depend first upon the reliability of the process in regular working all the year round, and upon the effect which local conditions may have in modifying its utility. So much, however, has been proved, that the cost of breaking down the coal is little if any more with the lime process than when blasting is used when the coal is undercut in long-wall working. The number of holes drilled in the lime process is more numerous in narrow veins, and the cost of drilling is higher; but the depth of undercutting is generally less for the same quantity of coal, while the cost of lime is sometimes more and sometimes less than the price of powder. An important point in favor of the new process is the fact that the quantity of slack made is not as considerable, and it is likely that this fact may balance other drawbacks, and decide in favor of it in many cases. It is likely, too, that increased experience in working with the lime cartridges will lead to greater efficiency and better work, and improvements in detail and manipulation will probably enable those who use them to grapple with difficulties, now unforeseen, as they may present themselves. There is one point which consumers of the coal thus mined may object to. The coal easily gets a coating of lime, which may spoil its appearance; but when it is fully understood that the quantity of lime mixed with the coal is only one tenth of one per cent, that drawback will be conceded to have little force. We have not dwelt upon the immunity from danger by the ignition of fire-damp, because that is a point which is too evidently important. It is a risk which in reality adds a certain sum to the cost of mining, and which should be as regularly accounted for as the cost of labor or supplies. Colliery proprietors can not be induced, nor should they be coerced, into using any other method than blasting, so long as its enhanced cost is greater than the equivalent of that risk. On the other hand, they should not hesitate to choose a slightly more expensive method, when it secures their property from the dangers of destruction by explosion and their employés from a fearful fate.—*Coal.*

OFFICIAL STATEMENTS AND REPORTS.

HOPE MINING COMPANY, MONTANA.

One of the straightforward, full documents as to the condition of the property, which are fortunately becoming more numerous, is the annual report of this company, whose headquarters are at St. Louis, and whose mines are located near Philipsburg, Montana. The company has 15 patented claims, and as many developing, applied for, or in controversy. In linear feet, developments are now 876 feet of shafts, 168 feet of inclines, 1179 feet of tunnels, 480 feet of levels and drifts, 34 feet of winzes and rises, 564 feet of stopes, and 340 feet of open cuts. During the year, the ten-stamp mill ran 312 days, partly after having been remodeled, and worked 4831 tons of ore, 1015 tons of tailings, producing 220,279·79 ounces of silver. The bulk of the ore came from the Hope mine, which yielded 5228 tons of unassorted ore at a cost of $9.13 per ton. The average assay value of the Hope ore was 47·18 ounces, the yield being 84·73 per cent, while the assay value of the tailings and concentrations was 13·2 ounces, yielding in the mill 60·7 per cent. The net cost of mining and milling was $111,568.19. The receipts during the year were $262,293.18, and after paying dividends to the amount of $56,515.50, and providing for a sinking fund of $60,000, the total cash balance in bank was $33,329.41, against $20,007.84 the previous year, not counting 16 bars of bullion in transit, valued at $20,895.

As for the condition of the mines, Mr. F. L. Perkins, the superintendent, reports that the ore-bodies on the Hope and Comanche lodes, which have supplied ore since July, 1881, are nearly exhausted, and no new ores have as yet been discovered. On the Field lode, no developments of value have been made, while in the Little Emma and Bay Horse the prospects are good.

NOTES ON COPPER SMELTING.

Written for the Engineering and Mining Journal, by F. L. Bartlett, State Chemist, Portland, Me.

A Cheap Blast-Furnace.—Wishing to experiment somewhat in the copper ores mined at Milan, New Hampshire, I was led to erect a small blast-furnace, which was built something after the Rachette pattern. The exceedingly low cost of this furnace, and the remarkable work it has performed, seem worthy of note, since it is generally understood that the building of blast or cupola furnaces suitable for economical copper smelting is something of an undertaking. The material required and used for the erection of this furnace, as per bills paid, amounted to $197.65, as follows:

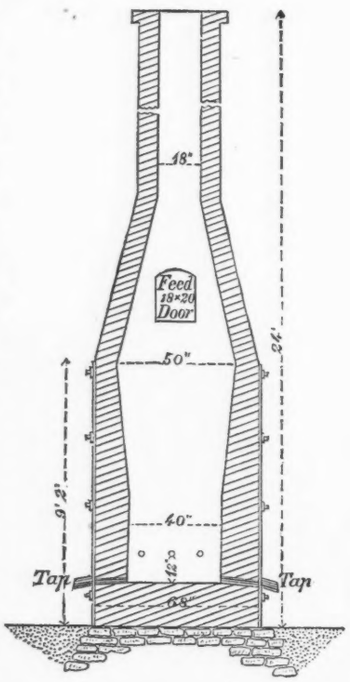
3500 fire-brick	$133.00
2000 pounds fire-clay	7.70
5 casks of lime	5.50
631 pounds refined iron	20 50
123 pounds galvanized sheet-iron pipe	18.45
75 pounds plain sheet-iron pipe	6.75
6 canvas tuyere bags	2.75
6 riveted tuyere irons	3.00
Masons' labor, 14 days	35.00
Blacksmith work, 6 days, and helper	18.00
Total cost	$250.65
Freight on material, 103 miles	35.50
No. 3 Boston blower (second-hand)	27.00
Belting and shafting	29.00
Six horse-power engine (second-hand)	100. 0
Twenty-five slag-pots	50.00
Furnace tools	7.50
Total with accessories	$499.65

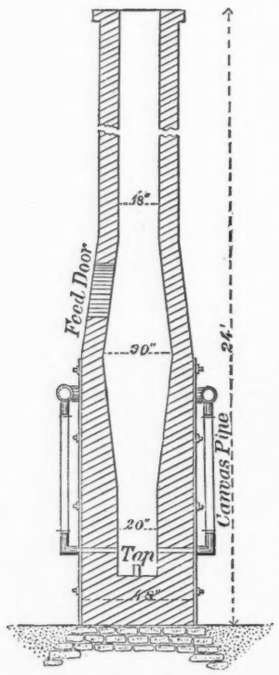
The building over this furnace is 20×25 and cost only $75. The building and the furnace were finished within seventeen days from the start; and the furnace was running on the twentieth day successfully. The accompanying illustrations in section are intended to give some idea of the shape of the furnace, which is rectangular, 20 inches by 40 inches inside at the tuyeres, and enlarged to 30 by 50 inches two feet below the feed-door. The walls at the base are 14 inches thick and 9 inches at the top. The total hight is 24 feet, the chimney being 18 by 18 inches inside. The feed-door is 9 feet above the furnace bottom. There are three tuyeres on each side, but none at the ends. The tuyere-pipes are 1·5 inches diameter, and are 12 inches above the bottom. The tuyeres

offset each other, so as to produce no "dead-centers." The furnace is bound together by flat iron 0·5 by 4 inches, secured by four ⅝-inch bolts passing through the furnace between the first and second course of bricks. The slag-spouts are made of boiler-plate and secured by a large bolt-rod passing through the foundation-walls. There are no binding-rods above the feed-door. The blower-pipe is 8 inches in diameter; the distributing-pipe, 6 inches, made of galvanized iron. Canvas pipes connect the distributing-pipes with the tuyeres. The tuyeres are made of No. 12 sheet-iron riveted, and are readily removed at any time. They can be renewed, when worn out, for a small sum. Although built hurriedly and at slight cost, and notwithstanding the fact that no time was taken properly to dry and season the furnace, the work it has done is, I think, remarkably good. The blower runs with a speed of 2400 revolutions per minute, which gives a blast pressure at the furnace of 0·625 pound per square inch. The ore is a mixture of iron and copper pyrites containing considerable zinc-blende. The silica amounts to about 30 per cent in the mixture. This little furnace readily smelts 2000 pounds per hour, and has been running some time without any repair save occasionally re-lining the sides. So far as can be seen, there is no reason why this furnace may not be run a long time, if properly cared for. We run it with a dark top and keep the charge up to the bottom of the feed-door. We do not run nights, but, when ready to shut down, the slag and metal are all run out, the blast turned off, and the tuyere-holes and tap plugged with clay. Then the furnace is charged full of ore and coke, and left in this condition until morning. No trouble is found in at once blowing in and tapping for metal in the morning.

The coke used is a poor quality of gas-coke, yet only one ton of coke is required to 5½ tons of ore. No "scaffolds" or "bears" have formed, nor has the furnace ever hung up since the first day it was blown in.

Pulp-Mill Waste as a Flux.—The numerous paper and pulp-mills in the Eastern States throw away vast quantities of lime and soda waste. This waste consists essentially of carbonate of lime mixed with a little soda, salt, carbon, and resin: the percentage of soda varies from 2 to 4 per cent. After experimenting with small quantities in crucibles, I came to the conclusion that this waste would make an admirable flux for copper smelting. I obtained a car-load from the Forest Fiber Company, of Berlin, New Hampshire, and have given it a thorough trial, and I am pleased to say that it has proved most satisfactory. We commenced smelting with the best Rockland lime, using 5 per cent in the ore mixture. Our slags contained 0·5 and 0·9 per cent of copper; and the smallest amount of coke we could run with was one ton to four of ore. Substituting the pulp-waste for the lime, and using from 5 to 7 per cent in the mixture, we immediately brought our slags down to from 0·006 to 0·017 per cent of copper, or to nearly absolute freedom from copper, while, at the same time, we are able to smelt with one ton of coke to 6½ or 7 tons of ore. Since this waste is of no value to the pulp-mills, and often has to be removed to get it out of the way, it follows that it can be obtained very cheaply. I am not aware that it has ever before been used as a flux; but, judging from my own experiments, I am positive that it has much greater value as a flux than the best burnt lime. The repeated burnings and washings to which pulp-waste is subjected must render the lime exceedingly pure, and put it in the best possible condition for the smelter's use. Besides, it contains soda enough to render fusion with it extremely rapid and easy. Whether it will work on other ores as well as it does on the Milan ores, is a question that yet remains to be proved. I am in hopes that other smelters will be induced to try the waste, and report on their results.





THE O'NEILL HOISTING-ENGINE BRAKE.

Mr. Eugene O'Neill, of the Union Iron-Works, San Francisco, has designed a brake for hoisting-engines which has some valuable and original features, and which has been used with success in two or three larger engines built within the last year. The accompanying engraving, reproduced from a working drawing, will suffice to explain its distinctive points. With the object of having the brake-blocks *C* act in radial lines upon the brake-wheel *A*, Mr. O'Neill suspends them upon opposite sides of the wheel which is directly attached to the hoisting-drum. The brake-shoes *B* are secured within the blocks *C*, the latter being provided with boxes at the rear, through which the pins *E* pass horizontally. These are supported by the links *F*, so that the brake-blocks may turn upon the pins and adjust themselves to the face of the wheel when pressure is brought upon them. The lower ends of the links are supported on pins *G*. The brakes are supported so that their centers are below the centers of the wheel, and the links *F* incline outward from it, so that when released the brakes fall away from the wheels by gravitation. The brakes are operated by a T-headed lever *H*, this lever being connected with an operating lever by a link. One of the arms of the T-head is connected with the center-pin *E* at the rear of the brake-block, upon the same side with the lever, and the other is connected with the pin of the opposite brake-block by a connecting or side-rod, as shown. It will be seen that when the long arm of the lever *H* is moved upward, one of the transverse arms will force its brake-block against the wheel from that side, and the other one will, through the side-rods, draw the opposite block against the wheel from the other side. The blocks move about the pivots of their supporting-links in radial lines toward the center of the wheel, and by reason of being journaled upon the pins *E* at their center, they will press evenly against the rim of the wheel. The weight of the brake-blocks and the inclined position of their supporting links *F* will cause the blocks to fall away from the wheel as soon as the pressure upon the lever *H* is relieved. To regulate their movement and make them fall back evenly and to an equal distance, Mr. O'Neill employs adjusting-screws *L*, which pass through nuts supported upon the stationary floor above the center of support of the brake-blocks, and other screws *N*, which pass through a cross-bar which extends between the links *F*. Suitable plates or buffers upon the backs of the brake-blocks strike against these screws, and the movement of the brakes is thus limited, and the upper and lower portions move back equally.

THE SILVER ISLET MINE AND ITS PRESENT DEVELOPMENT.

Written for the Engineering and Mining Journal by Francis A. Lowe, M.E.

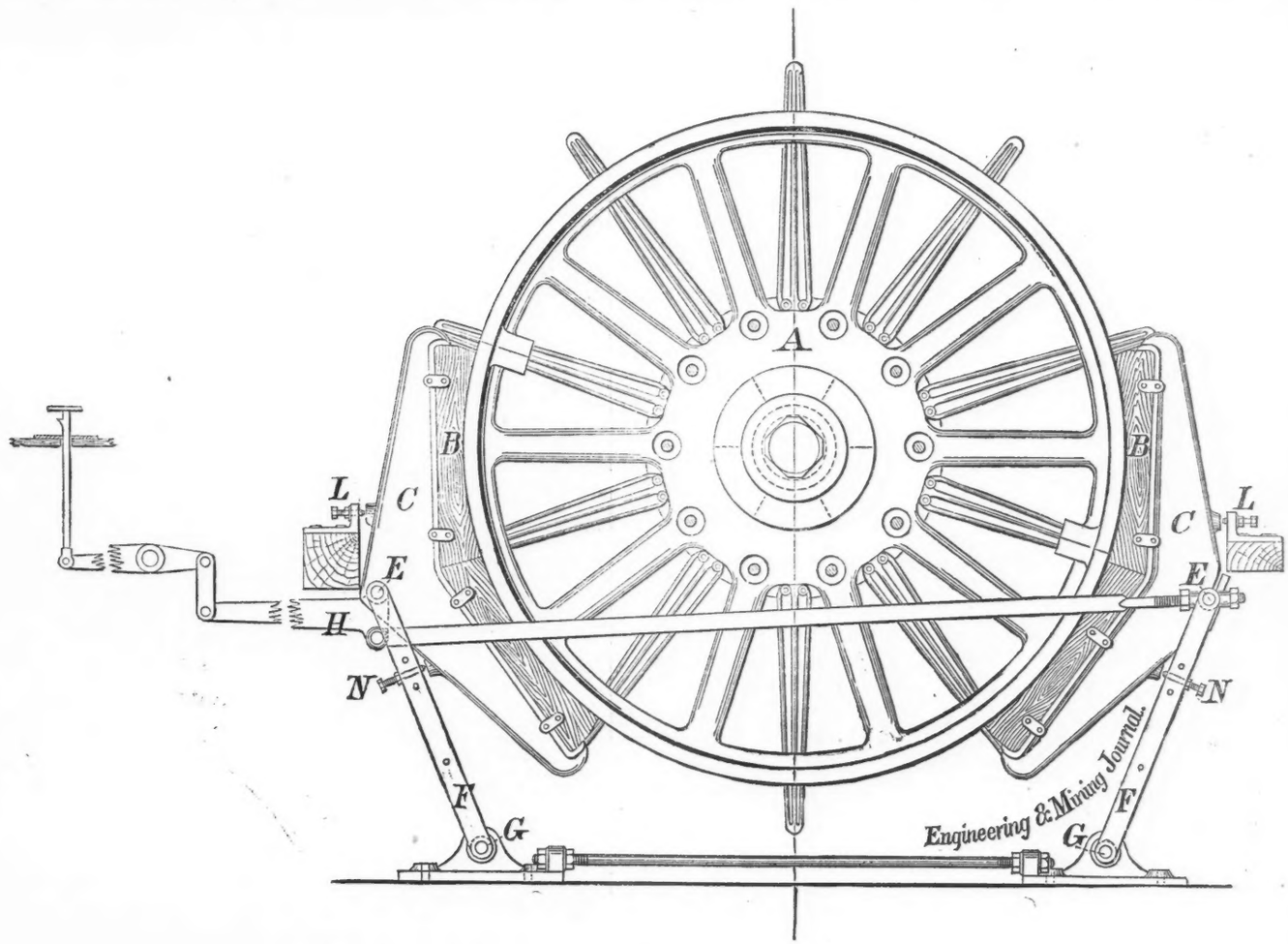
As this vein, with others on the north shore of Lake Superior, is in many respects similar to the veins of Batopilas, Mexico, especially in the occurrence of native silver in diorite, the following will bear directly upon its discovery, development, and some interesting geological facts. Like most mines, it has had its periods of adversity, which have well-nigh exhausted the patience and faith of those who have weathered adverse criticism, and still place reliance in a mine which in its early development produced two bonanzas of native silver.

During the writer's three years' connection with the property, he found ample opportunity to study the interesting geology, and particularly the vein, accompanied as it is with phenomena unusual to silver mines, deposits of silver and of hitherto unknown compounds of silver.

The discovery and early history of this mine are ably set forth in the interesting pamphlet on Silver Islet, by Thomas Macfarlane, the discoverer. Previous to 1868, very little was known of the geology of this district and of its mineralization. About that time, the Montreal Mining Company, of Canada, the owner of 200,000 acres of mineral land located at different points inland and on the lake shore, hard pushed by adversity in previous mining ventures, delegated Mr. Macfarlane to explore these locations, which had been examined by Professor Shepherd in 1846. In the summer of 1868, Mr. Macfarlane, with an exploring party, visited the different locations, on which he found encouraging indications of native silver, copper, and their sulphurets. These deposits were found in veins immediately on and near the shore, and had been laid bare by frequent storms. Inland, extended exploration was impossible, as the country, a few feet from the lake, was found to be covered with a dense growth of moss. This moss in many places is three feet in depth; and until it is removed by repeated fires, the geology and mineral of the interior will be in doubt. The numerous veins are sufficient evidence that the country is highly mineralized, and that it has been subjected to intense igneous action. In exploring trips, covering a distance of 150 miles of coast and ten miles inland, the writer found that the whole country had been frequently rent asunder by vast outcroppings of diorite, granite, and amygdaloid. These in many places make up the whole country, while in others the primitive rocks stand out in strong relief. The result of Mr. Macfarlane's observations was the discovery of the Silver Islet vein, near the base of Thunder Cape, a magnificent promontory of diorite. It was found on Wood's location, which consists of a water and land area of 16,000 acres. In the neighborhood of the vein, the waters are studded with picturesque islands forming hog-backs of an extended series of parallel dikes of diorite, corsite, anorthite, and hyperite. These are heavily covered with moss and timber. On one of the smallest hog-backs, cropping about eight feet out of water, of an area of about 1000 square feet, and distant one mile from the main-land, a large and powerfully mineralized vein in two parts was found boldly striking N. 36° W. inland, crossing Burnt Island near the shore, through and across the bedding of the intervening argillaceous schists, and through an extended series of parallel dikes of diorite, etc. The geology of this location is principally made up of vast beds of white and red dolomitic limestones, coarse conglomerate, indurated marl and chert. These beds have been rent by parallel east and west and north and south fissures. Out of the former poured a variety of diorite. The north and south fissures were filled with vein-matter. Including the hog-back known as Shangoinah Island, the vein breaks through and across the bedding of the schists and through a series of twenty-one dikes, all of which have been more or less faulted by the fissure. Its greatest intensity was exerted in the Silver Islet dike, which has been thrown eighty feet to the north. The dike is 200 feet in width. The power of the fault is manifest in the man-

ner in which these dikes and beds have been dislocated in a horizontal direction. The width of the dikes varies from a few feet to over 300, with a general dip of 75° to the southeast. Their strike is a little north of east. The dip of the intervening strata is 8 degrees to the southeast. The dip of the vein is about 67 degrees to the northeast. The original islet during heavy weather formed a reef over which the seas broke with terrific force. It was exposed on the southeast and west to a 200-mile sweep of the lake. It was noticed that the two veins apparently united north and south, which subsequent exploration proved to be the case. The western branch, now known as the main vein, was entirely under water, while the eastern cropped boldly across the islet. The east vein was about ten feet in width, and the main vein about eight feet. The horse of diorite was about twenty feet in width. The main vein, as it disappeared in deep water, was found carrying a twenty-inch streak of native silver on the hanging-wall, and both veins were highly mineralized in blende, lead, pyrites, and graphite. Exposed as the vein was to frequent incursions of heavy seas and long and intensely cold winters, the early development was attended with repeated disasters to every attempt to secure the islet; cribbing after cribbing was torn away, involving heavy loss in silver, time, labor, and money. It was only after an expenditure of $1,500,000 that the islet was made secure and was equipped for deep mining, although the heavy storms and ice of each winter do their share to undermine and dislodge the weaker cribbing, thereby entailing an almost continual expense to keep them in repair. The outer cribbing is sunk in 30 feet of water, is 700 feet in length and 25 feet in width, firmly bolted together and filled with rock. It forms the present breakwater for the heavy southeast seas. These cribs have stood the test of seven winters, and are firm and solid upon their foundations. The original islet is now surrounded by an extensive system of cribs, jutting against each other, inclosing an area of nearly four acres, upon which are all the buildings and appurtenances for deep mining. The island has the appearance of a floating village.

In developing the rich streak of silver, a heavy and strong coffer-dam, with concrete lining and concrete shaft-foundation, was necessary: this was backed up by strong outer cribbing. This streak extended for a distance of 100 feet on the hanging-wall of the main vein, and for nearly a like distance upon the same wall of the east vein. It varied from six inches to over two feet in width, finally disappearing below the sixth level. The silver did not crop out in the east vein, but was found in cross-cutting through the horse of diorite on the first level. It extended upward within 40 feet of the outcropping. The shape of this bonanza was that of an irregular pear, and throughout its extent in both veins it was accompanied with a strong impregnation of graphite, which formed the selvage of both veins. The bulk of this bonanza was arborescent silver, more or less mixed with macfarlanite, a rich ore of silver, carrying 78 per cent of that metal, along with arsenic, cobalt, and nickel. Its physical structure resembles niccolite. It was not until 1870 that extended work was begun to develop this bonanza, although it had been known since 1868. It was completely worked out by 1874, yielding over $2,000,000, more than $1,200,000 of which were expended in securing the islet. A dividend of $700,000 was declared and paid. The paying at once of such a large dividend was found later, in the long period of adversity of the mine, to have been inconsistent and unwise, notwithstanding the strong belief that other deposits would soon occur. It left the mine barren of silver, but with sufficient funds in the treasury for several years' developments. The rich streaks left in the roofs of both veins could not all be taken out without endangering the future of the mine. Much, however, was removed by small holes, and in one place under the pump-bob the main vein is stoped out within six feet of its outcropping. In the survey of the mine, this place was found drier and more compact than any other part of the vein: no water was noticed oozing from the back. This bonanza left the mine in good condition for future development. All the levels, including the sixth, had been driven north and south well into the great width of vein-stone. The average width of the vein in the breast of all the levels is about 8 feet. In the sixth level, south, it is over 30 feet, but somewhat vuggy. North of the old shaft,



at the junction of the two veins, the vein-stone is of great width; but little or no silver was found. The shape of the horse of diorite is not unlike the half of a double convex lens: both veins unite north and south at the junction of the diorite and schists, and also on the fourth level; thence they continue as one vein with an average width of eight feet. In sinking the old shaft, it was noticed that it was gradually leaving the dike, and on the ninth level its bottom is entirely in the contiguous schists. North of this shaft, below the fourth level, the vein shows a weakness which becomes greater as the levels are driven into the schists. The influence of country-rock upon this vein is very apparent from the development on the sixth level, north, and on the ninth, both north and south. In both levels, on entering the schists, the vein gradually thinned out to mere stringers; but recovered its width on entering two other dikes north. Both of these dikes were found faulted fifty and ten feet respectively, and the vein in them was highly mineralized. These dikes were struck on the ninth level, north; but no work was done beyond drifting, and nothing was done to determine whether they were plumbiferous, as the Silver Islet dike. The seventh, eighth, and ninth levels in the dike showed up a highly mineralized vein. On the ninth level, a small bunch of silver was struck, accompanied with graphite. This level is the longest one in the mine, 1400 feet in length, 700 feet each way from the old shaft. In drifting south, a small dike of a few feet in width was met. The years from 1874 to 1878 were devoted entirely to exploring, and but little silver was mined. During this period, the present new inclined shaft, 14 feet by 7 feet, was started from the ninth level, 180 feet south of the old shaft, diagonally across the vein, in the center of the dike, and on the pitch of the same. Previous to the sinking of this shaft, the diamond drill was extensively used in different

parts of the mine, to test the persistency and silver-bearing nature of the vein. Long holes were driven north and south on the first level. In one of them south, silver was struck, but it proved to be only a small pocket. On this level, 400-foot holes were driven east and west for parallel veins. Forty feet west, a small vein was struck: this vein crops out in the water, and is apparently a consort vein of the same strike and dip. On the eighth level, a cross-cut proved it to be nearly four feet in width. Considerable drifting north and south from the cross-cut was done, but no silver was struck. On the fourth level, a cross-cut found the vein to be broken in stringers; but the contiguous diorite was saturated with graphite to such an extent that the men looked like coal miners. This vein has the physical structure of the main vein. The long holes east and west on the first level proved that the dike was saturated with graphite, which is also noticed in its outcroppings known as Pyritic and Ship islands, one and five miles from the mine. Out of the whole series of twenty-one dikes cut by the vein, so far as is known, the Silver Islet dike is the only one impregnated strongly with graphite and pyrites. In this respect, it resembles more a fahlband. On the third level, south, another series of holes was driven, and one of them, which was subsequently proved, skirted along within a few inches of the second bonanza. The failure to strike this deposit was due to the fact that the holes were sent in fan shape more or less in a vertical plane. Had they been driven horizontally, the bonanza would have been struck. The small pocket of silver struck on the first level, south, was followed later by a considerable streak of argentiferous pyrites running 2000 ounces per ton; lead, with 800 ounces per ton; and native silver. This streak was struck near the junction of the two veins on the hanging-wall in a cross-cut, and extended down as far as the second level. It varied from a few inches to a scattered foot in width, and, like the preceding bonanza, it was accompanied with considerable stamp-rock. The junction of the two veins was nearly twenty feet in width, of beautiful pink spar. Extended drifting on this body of vein-stone is not possible, as the depth of water increases rapidly south. The above streak was found after the second bonanza. The writer has since learned that another small bunch was struck south of this point on the same level. Diamond drill-holes were driven south in the breast of all the levels, furnishing cores of pink spar highly mineralized. On the eighth level, south, gas for the first time was met in considerable volume along with an acrid mineral water. It was, however, previously met with in the third and sixth levels. This gas is believed to be light carbureted hydrogen. It has never been analyzed; and were not the mine so well ventilated by infiltrating water, terrific explosions would occur. When slowly issuing, it burns with a purple, blue, yellowish flame. On this level, the gas was struck by the drill in 1876, and has since been burning slowly. On striking it, it came out with great force, and, on being ignited, lightly exploded, sending a sheet of flame the whole length of the drift. The water, which invariably accompanies the gas, contains principally chloride of calcium in solution. The occurrence of this gas is traced to the influence of graphite and water under enormous pressure; and as it is met in the deepest workings, it argues for the theory that other deposits of silver may be met as long as this gas exists. If it comes from the deposition of plumbago and water, and as graphite has been the leader in six different parts of the mine to silver and graphite has never been found alone in the vein, it follows that the occurrence of gas may lead to deposits of graphite. The graphitic impregnations in this vein are analogous to the black *borrasco* or sweat of the veins of Batopilas, Mexico, where it invariably accompanies all deposits of silver. The origin of the mineral water is still a mystery, and especially the presence of chlorine in it. No sodium salts have been detected, nor have any deposits of chlorides been struck. Two gallons of this water furnished, roughly measured, nearly a pint of very acrid and deliquescent salt, chloride of calcium. On the ninth and tenth levels, great volumes of this gas were struck south of the new incline shaft, and exploded with considerable force, shaking the mine like an earthquake. Several of the men were seriously burned, and many had their eyebrows and whiskers completely destroyed, while others were blown bodily away from their work. The gas and water are principally confined in large vuggs or cavities in the vein under great pressure. These vuggs are generally lined with beautiful crystals of lead and dog-toothed spar. On the tenth level, south, an immense reservoir of this water was struck, which it took two days of constant pumping to exhaust. Above the eighth level, all water infiltrating into the mine is pure lake water, while below this level is a zone of highly mineralized water. Notwithstanding the great body of water of both kinds met in the vein, in sinking the new inclined shaft below the ninth level, periods of absolute drought occurred, in which water had to be taken down to feed the drills. The gas is unequally distributed throughout the lower workings, occupying independent cracks, fissures, and vuggs. Exploration showed up a series of such vuggs independent of each other, as each was preceded by a hard and compact vein-stone. The new inclined shaft from the ninth level was sunk under many difficulties at first. In this level, the drill was used extensively, to test the persistency of the vein and its silver nature. On the dip of the deepest hole, 380 feet in depth, and on the dip of the dike, the new shaft was started. Farther sinking of this hole with the drill was retarded by enormous volumes of gas and water. On withdrawing the drill at that depth, the gas and water came out with terrific force. It was finally plugged; and in order to test its pressure, to see if it came from the lake, a small half-inch pipe was inserted in the plug, and the pipe extended upward. At a hight of 118 feet, the water and gas slowly ran out. In sinking this shaft, a six-foot plug was tightly driven home in the hole, and at every five feet of sinking the plug was re-driven home. In this way, the gas and water were confined. Several times the plug was blown out by the pressure and effects of blasting, the gas igniting from the candles, and a fountain of fire and water was thrown sixty feet up the shaft. In each case, four men were required to reinsert the plug. The water annoyed the men very much; on touching their skin, it would almost blister it, so strongly was it saturated with chloride of calcium. In driving the ninth level, south, another bunch of silver was struck on the foot-wall of the vein. Throughout the mine, nearly 5000 feet of holes were bored by the drill, and the persistency of the vein tested to a depth of 1000 feet.

North of the old shaft, silver was mined from the surface to below the first level; also on the fourth level, north, in under-hand stopes. Below this level, no silver has been struck in the various drifts, though the vein on the average is strong and consistent, but somewhat brecciated in places. The pitch of the first bonanza followed that of the dike. At this period—1876—the new inclined shaft was only sunk 100 feet, and development throughout the mine was reduced. From 1874 to 1878, very little silver was mined. As a last resource, to enable the company to open the unexplored parts of the mine above the ninth level, and to continue the new inclined shaft, it was decided in 1878 to bond the mine and 200,000 acres of mineral lands for $400,000, and at the same time to put in an artificial roof of brick over the east vein, and blast out the remaining silver. This was feasible, and could have been successfully carried out. The bricks and cement had arrived, and the proper hitches for the spring of the arch were cut from the walls of the east vein. The arch was to be three feet thick, about sixty feet below the lake. The main shaft was to be bricked and cemented below the cross-cut, which would have been driven from the shaft through the horse of diorite to the east vein above the crown of the arch. Strong dams were to be placed in this cross-cut, to keep back the lake water after the final blasting. The silver was to be recovered by divers and grappling-hooks, as had been done frequently in the early days of the mine. At this time, in order to curtail the heavy pumping expenses, the pump-rods were cut below the third level, and the mine allowed to fill up. The boards had all been taken up, and the preliminary work on the arch commenced, when, in drifting south on the third level, in August, 1878, strong impregnations of graphite were met on the hanging-wall, which were soon followed by the second bonanza. This deposit of silver was remarkable for its great width, five feet solid across the breast, and the occurrence in great quantity of two hitherto unknown compounds of silver, namely, animikite and huntilite. The shape of this bonanza was that of an inverted cone, with a base of about fifty feet on the third level, with the apex down as far as the fifth level. This deposit was phenomenal in its structure, and a winze in the middle of the deposit to the fourth level, sixty feet, was sunk literally through native silver, the metal standing out boldly from the four walls of the winze. In the breast of the drift, it stood out in great arborescent masses, in the shape of hooks and spikes, in gnarled, drawn out, and twisted bunches, followed by arborescent silver with intercalated bands of animikite and huntilite. This deposit was struck near the junction of the two veins, and the whole extent of the bonanza was strongly saturated with graphite, carrying a selvage of the same in the hanging-wall three inches thick. The hanging-wall was as smooth and as polished as a mirror, with horizontal striæ, showing that the great heave in the dike of eighty feet occurred subsequently to the filling of the fissure. The width of the vein was over ten feet, and the entire deposit, including the stamp-rock, yielded about 800,000 ounces of silver. An interesting fact connected with this deposit was noticed in the manner in which the arborescent silver was disseminated throughout the whole width of the vein, and in the concentrated parts, and the manner in which it was impregnated through a series of horizontal floors in the vein. These floors did not break or separate the deposit. This deposit paid off the bonded indebtedness, leaving a surplus of $300,000, which, however, was expended, along with six assessments, in the construction of the new shaft to the surface and sinking the same 500 feet below the ninth level, in driving five levels north and south from the same, equipping it with new pumping machinery, developments in the upper parts of the mine, and two years' work on Burnt Island and the main-land. On the main-land, five shafts were sunk from 40 to 170 feet in depth, on the course of the vein, with extended drifting north and south, without finding silver, though the vein was found highly mineralized with the characteristic pink spar of the Islet mine. The diamond drill was extensively used on Burnt Island and Shangoinah Island. Considerable work was done on a vein near Thunder Cape. On the Pigeon River location, fifty miles west of Silver Islet, a year's work was done on several north and south veins carrying gray copper. On the island of St. Ignace, ninety miles east of Silver Islet, nearly a year's work was done on several veins which carried considerable traces of native silver and gray copper. Nothing of importance, however, was struck in these various explorations, although indications were encouraging to continue work on the island of St. Ignace. From 1878 to the present date, the mine has been passing through its second period of adversity, although in that time silver has been struck in various parts of the mine below the ninth level. The only important deposit met with was on the thirteenth level, south. This was also accompanied with a graphite impregnation; but from its irregular and detached condition, it did not augur well for a large deposit. It yielded about $30,000. It was, however, encouraging, and dissipates all doubts as to the existence of silver below the ninth level. Gas and water were struck in considerable volume. The new incline shaft is now down nearly 1200 feet, with a strong and highly mineralized vein in the bottom, the vein being nine feet in width. The vein, from top to bottom, north and south, is highly mineralized, and consists of a beautiful, fine-grained pink spar, with intercalated bands of quartz. The aspect of the vein has always been encouraging; and whether it is still silver-bearing at greater depths, is a matter for the indulgence of speculation and theories. The history of the mine, and the strong persistency and highly mineralized nature of the vein, are, however, in its favor, and would seem to warrant a vigorous and energetic development at greater depths. At present, the diamond drill is used in the deepest workings, and the future of the property will in some measure depend on the fruits of its use. The system of parallel dikes is in each case accompanied with a parallel contact-vein, locally known as east and west or dike-veins. Some of these are of great width, heavily charged with pyrites, and filled with a coarse, granular calc-spar, not unlike the spar of their kindred veins of Batopilas. The spar of these dike-veins is totally different from that of the Islet vein in physical structure. These dike-veins or fissures were formed by the lateral contraction of the dikes, many of which are heavily charged with magnetic iron. The volume of water made by the Islet mine per minute is about 170 gallons, its principal source being above the ninth level, and it is easily kept under control by the heavy pumping machinery. The total length of the underground workings is

over one mile, and the present development and the discovery of the second bonanza have been due to the faith and perseverance of Mr. Edward Learned, who, without recompense, has carried the mine through many difficulties with an unshaken belief in its future. As an example of hydraulic engineering under the most adverse conditions, the present security of the Silver Islet mine and its present outlook command the admiration of all engineers who have visited it.

The output of the mine has been over $3,000,000. As a last resource, the company is about to re-bond the property, to enable it to sink the incline shaft deeper, and work the interesting native copper deposits recently discovered on one of the locations near Point Maimanse, in the lower part of the lake. These copper deposits occur as impregnations in belts of epidote and amygdaloid, and also in veins crossing them. The copper is finely disseminated through the rock, running about three per cent, and concentrating well upon Frue vanners.

LIGHTING A GREAT CITY BY ELECTRICITY.

Doctor Siemens, in his usual practical and lucid style, has given some figures on the cost of the plant required for the lighting of such a city as London by building main stations and establishing electric mains in the shape of copper rods of great thickness, with branches diverging in all directions. Doctor Siemens is averse to such a plan, and by way of illustration takes the parish of St. James's, London, which has a population of 29,865, contains 3018 inhabited houses, and has an area of 784,000 square yards. Assuming that the bulk of domestic lighting remains to the gas companies, and that the electric light is introduced into private houses only at the rate of 12 incandescence lights per house, the parish of St. James's would have to be provided with electric energy sufficient to work 63,378 lights, or 7042 horse-power effective. The cost of building a large underground chamber, to contain the machinery, the cost of boilers, engines, and dynamo-machines necessary would be £140,000. The quantity of copper for conductors in the entire system would be nearly 168 tons, and would cost £15,120. The iron pipes would require £37,000 additional, which would carry the total to £177,000 for providing for one quarter of the consumption in lighting the parish of St. James's alone. Dr. Siemens goes on to say: The large aggregate of dwellings comprising the metropolis of London covers about 70 square miles, 30 of which may be taken to consist of parks, squares, and sparsely inhabited areas, which are not to be considered for our present purpose. The remaining 40 square miles could be divided into, say, 140 districts, slightly exceeding a quarter of a square mile on the average, but containing each fully 3000 houses and a population similar to that of St. James's. Assuming 20 of these districts to rank with the parish of St. James's (after deducting the 600 shops which I did not include in my estimate) as central districts, 60 to be residential districts, and 60 to be comparatively poor neighborhoods, and estimating the illuminating power required for these three classes in the proportion of 1 to ¾ to ½, we shall find that the total capital expenditure for supplying the metropolis with electric energy to the extent of 25 per cent of the total lighting requirements would be say £14,000,000, without including lamps and internal fittings. To extend the same system over the towns of Great Britain and Ireland would absorb a capital exceeding certainly £64,000,000, to which must be added £16,000,000 for lamps and internal fittings, making a total capital expenditure of £80,000,000. Some of us may live to see this realized; but to find such an amount of capital, and, what is more important, to find the manufacturing appliances to produce work representing this value of machinery and wire, must necessarily be the result of many years of technical development.

The amount of the working charges of an establishment comprising the parish of St. James's would depend on the number of working hours in the day and on the price of fuel per ton. Assuming the 64,000 lights to incandesce for six hours a day, the price of coal to be 20s. a ton, and the consumption 2 pounds per effective horse-power per hour, the annual charge under this head, taking eight hours' firing, would amount to about £18,300, to which would have to be added for wages, repairs, and sundries, about £6000; for interest with depreciation at 7½ per cent, £13,300; and for general management say £3400; making a total annual charge of £41,000, or at the rate of 12s. 9½d. per incandescence lamp per annum. To this has to be added the cost of renewal of lamps, which may be taken at 5s. per lamp of 16 candles, lasting 1200 hours, or to 9s. per annum, making a total of 21s. 9½d. per lamp for a year. In comparing these results with the cost of gas-lighting, we shall find that it takes 5 cubic feet of gas, in a good argand burner, to produce the same luminous effect as one incandescence light of 16 candle-power. In lighting such a burner every day, for six hours on the average, we obtain an annual gas consumption of 10,950 cubic feet, the value of which, taken at the rate of 2s. 8d. per thousand, represents an annual charge of 29s., showing that electric light by incandescence, when carried out on a large scale, is decidedly cheaper than gas-lighting at present prices and with the ordinary gas-burners. On the other hand, the cost of establishing gas-works and mains of a capacity equal to 64,000 argand burners—the equivalent of the electrical illumination of St. James's—would involve an expenditure not exceeding £80,000, as compared with £177,000 in the case of electricity; and it is thus shown that, although it is more costly to establish a given supply of illuminating power by electricity than gas, the former has the advantage as regards current cost of production. It would not be safe, however, for the advocates of electric lighting to rely upon these figures as representing a permanent state of things. In calculating the cost of electric light, I have only allowed for depreciation and 5 per cent interest upon capital expenditure, whereas gas companies are in the habit of dividing large dividends, and can afford to supply gas at a cheaper rate, by taking advantage of recent improvements in manufacturing operations and of the ever-increasing value of their by-products, including tar, coke, and ammoniacal liquor. Burners have, moreover, been recently devised by which the luminous effect for a given expenditure of gas can be nearly doubled by purely mechanical arrangements, and the brilliancy of the light greatly improved. On the other hand, electric lighting also may certainly be cheapened by resorting, to a greater extent than has been assumed, to arc lighting, which, though less agreeable than the incandescence light for domestic purposes, can be produced at less than half the cost, and deserves, on that account, the preference for street lighting and for large halls, in combination with incandescence lights. Lamps by incandescence may be produced hereafter at a lower cost and of a more enduring character. Considering the increasing public demand for improved illumination, it is not unreasonable to expect that the introduction of the electric light, to the full extent here contemplated, would go hand in hand with an increasing consumption of gas for illuminating and for heating purposes, and the neck-to-neck competition between the representatives of the two systems of illumination, which is likely to ensue, can not fail to improve the quality and to cheapen the supply of both, a competition which the consuming public can afford to watch with complacent self satisfaction. Electricity must win the day, as the light of luxury; but gas will, at the same time, find an ever-increasing application for the more humble purposes of diffusing light.

THE SPONTANEOUS COMBUSTION OF BITUMINOUS COALS.

The spontaneous combustion of bituminous coals has always been a tempting subject for investigation to scientists, because a proper choice of the means for averting such calamities must be dependent upon a clear understanding of the causes. The localities where spontaneous combustion is most to be feared are in the abandoned workings of mines, where the fire endangers the workings, in the piles in yards, and in the holds of ships. We know that coal is never a simple chemical compound of its elements, but an aggregate of probably many compounds, with widely differing properties. It is natural, therefore, that the liability of coals to spontaneous combustion varies very widely. We know also that the admixture of other substances, such as pyrites, considerably affects the question, and that the conditions of piling, etc., have much influence. To trace their effect, and from it gauge their relative importance in a general way, is, therefore, an intricate problem, and it is likely that only an accumulation of evidence obtained by the examination of many grades of coal will enable us to reach conclusions generally applicable. Parliamentary inquiry in Great Britain, and many governmental and private investigations abroad and in this country, have shed much light on the subject and have developed conflicting views. The time for generalization has not yet come, and we can not do more than gather data. The latest have been furnished by two French experimenters, Durand and Fayol, who have discussed the matter from two different points of view, which fairly represent the two opposing opinions which are now battling for ascendency among scientific men. M. Durand has made an interesting series of experiments to show that coal-slack in small piles reaches a maximum temperature, and then cools off to the temperature of the surrounding air, while in large heaps the heating continues until the mass ignites. He found that for Commentry coal it must be heated to a temperature ranging from 140 to 212 degrees Fahr., and that the surface exposure of the pile into which it is formed must not be more than one square foot per cubic foot of contents. He raises the question how the initial heat is produced. Like many others, M. Durand seeks the cause chiefly in the decomposition of pyrites disseminated in the coal by the attraction of oxygen from the air. He cites a case in the Poullauen mines, where the air in an abandoned working, surrounded by pyritous rock, was reduced to a percentage of only 9·6 per cent of oxygen. He holds that the decomposition of pyrites suffices to create a temperature, locally, of more than 212 degrees Fahrenheit. He urges that pyrites and its products of decomposition ignite more readily than any hydrocarbons. In mines, he looks upon the heat generated by the pressure and movement in pillars as a potent cause of ignition. In coal containing no pyrites, he attributes a leading part to the presence of dust and the generation of hydrocarbons liberated at a low temperature. M. Fayol declines to attribute so much importance to the decomposition of pyrites. He holds, above all, that spontaneous combustion is due to the absorption of oxygen by coal, which may amount to five, eight, and even ten per cent of its weight. This absorption is increased by higher temperature, and by a finely-divided condition of the coal, and he holds that anthracites may be as liable to it as bituminous coals or lignites. Any causes that contribute to render this absorption more rapid, and to retain the heat in the mass, increase the danger of spontaneous combustion. A complete removal of air, or, better still, a very rapid ventilation, keeps the temperature below the temperature of ignition. M. Fayol has carefully gone into the pyrites question, and his experiments warrant his conclusion that its presence has very little to do with the spontaneous combustion of coal. —*Coal.*

THE ADVANTAGES AND DISADVANTAGES OF THE KOEPE WINDING SYSTEM.

Mr. C. M. Percy, of Wigan, England, who has, probably more than any other engineer, carefully studied the questions coming up in regard to the mechanical engineering of mines, in the course of a recent lecture delivered before the North Staffordshire Institute of Mining and Mechanical Engineers, made the following remarks on the Koepe hoisting system: An improvement, or at least an alteration, will be the abolition of winding drums. These, however constructed, do not work the rope under the most favorable conditions. They either have the diameter constantly changing or else compel a side movement which is injurious. They add to the first cost of the engines, and their weight and space necessitate a long and strong crank-shaft, and generate friction. It has been left for foreigners to introduce a mechanical arrangement which removes some serious defects in modern winding appliances. Introduced by M. Koepe, a German mining engineer, it bears his name, and has been largely adopted on the continent. It is only in use at present at one colliery in the United Kingdom—namely, that of the Bestwood Coal and Iron Company. There are no winding drums in this arrangement, and instead, a simple pulley very similar to the pulleys on the head-gear. There is only one winding rope, which has a cage at each end, and simply passes about half round the drum-pulley. There is a tail-rope under the cage, and so far, the arrangement is simple enough. It was intended that there should be no conductor, the idea being that the tail-rope would induce so steady a movement that conductors would not be needed. But conductors are needed, and should always be put in. Such is the Koepe system—pure and simple; but unfortunately, compli-

cation has been added. Should the winding rope break, there is nothing for it but both cages going down the pit; and to meet that supposed danger, two safety ropes are used, attached to the cages at their respective ends. If the winding rope breaks, these two safety ropes come into operation by gripping tightly the pulley in which they work, or rather the pulleys grip them; and these pulleys being scotched, the ropes can not move, and the cages are held fast. But these ropes are not needed. As regards a winding rope breaking, if that happens, in nearly every case the cage falls down the pit, and the Koepe winding rope is less likely to break than an ordinary rope. Winding ropes ought not to break, and with proper care, if well made, will not break, and Mr. Percy cares nothing for appliances the object of which is to prevent accidents when a rope breaks. The advantages claimed for the Koepe rope are: (1.) Winding drums are dispensed with, thus avoiding their expense at first, and their weight afterward. (2.) The load is exactly uniform throughout the winding. (3.) The winding rope always works in the same line. (4.) The load is exactly the same upon every point of the rope. (5.) The rope does not coil upon a varying diameter, and if, as they can be easily enough, the drum-pulley and head-gear pulley are made the same size, the rope is always working upon the same diameter. (6.) Less engines will do the work, because their own weight is less, and the load is uniform. (7.) The crank-shaft needs to be of less dimensions. (8.) The engines occupy less space, having less intervening distance, and therefore a smaller engine-house suffices. The objections raised are: (1.) That the rope will slip upon the drum-pulley. It should be remembered that, owing to the influence of coil friction, there is not so much liability to slip as one would be inclined at first to think. If a cord or rope passes round a cylinder, or shaft, or pulley, or drum, the extent of the circumference which the rope covered in Koepe—namely, rather more than half—it will require a force of four tons at one end to cause the rope to move when the pulley is stationary, if there is only a counteracting weight of one ton at the other end. And as a fact, the rope does not slip. (2.) The objection is made that the rope can not be capped. Of course, it can not in the same way that ordinary ropes are capped, because the rope has to be the right length when it is put on. But frequent capping ought not to be necessary; a good capping should wear as long as a rope, and should one or two re-cappings be needed, a short length of chain can be put in. (3.) An objection is, that detaching hooks can not be applied. They are not necessary, and, indeed, the Koepe system gives the best detaching-hook arrangement, or rather, it does what no detaching hook can accomplish, it prevents over-winding. When the cage is drawn up into the pulley, the descending cage drops upon a landing arranged with weights to prevent a sudden shock, thus taking weight off the rope; and if the cage is drawn still higher, until it comes in contact with something, it stops there, and the drum-pulley goes on revolving while the rope slips. At the Bestwood collieries, the Koepe arrangement has done and is doing well. Two pairs of winding engines receive their steam from the same range of boilers, and wind from two pits the same depth. One pair of engines has the Koepe pulley, the other pair has not; and with the same load and depth and steam pressure, the Koepe system, with smaller engines, performs a winding in equal time with the other pair of engines of larger dimensions. The Koepe is very extensively applied on the continent, and Mr. Percy believes that in years to come it will become popular in England.

THE DUTY ON CHEMICALS.—The schedule of chemicals proposed by the Tariff Commission has been revised by the Ways and Means Committee. Among the items we find the following, the duty upon which has been settled upon: Re-sublimed iodine, 40 cents per pound; acidulated phosphate of lime, ammoniated or otherwise, $3 per ton; manufactured asbestos, 20 per cent *ad valorem;* crude barytes, 10 per cent; refined borax, 3 cents per pound; cement, 20 per cent; blue vitriol, 3 cents per pound; copperas, 0·25 cent per pound; brown acetate of lead, 3 cents; white lead, dry, and litharge, 2 cents; crude carbonate of potash, pearl-ash, and caustic, 20 per cent; crude nitrate or saltpeter, 0·5 cent; refined, 1 cent; soda, and soda ash, 0·25 cent; salt-cake, refined sulphur, $10 per ton; ocher, 0·5 cent; oxide of zinc, 1 cent.

THE WILSON GAS-PRODUCER.—Among the best-known English gas-producers, is that of Mr. A. Wilson, of Middlesborough, which has also been introduced to some extent in this country. Mr. Wilson injects steam, claiming that it reduces the percentage of nitrogen in the resulting gas, and consequently, increases the percentage of combustible, and that it serves as a simple form of motive power to force air in, and by cooling the lowest part of the combustion-chamber enables the ashes and clinkers to be easily withdrawn. When working on a coal containing 86 per cent of fixed carbon, 5 per cent of hydrogen, and 4½ per cent of oxygen, with 2 per cent of water, the gas from these producers was found by analysis to have the following composition by volume:

	Per cent.
Nitrogen	56·11
Carbonic oxide	26·89
Hydrogen	11·55
Carbonic acid	4·00
Carbureted hydrogen	1·45
Total	100·00

The total percentage of combustible thus amounted to somewhat over 40. An examination by calculation based on the analysis of the coal used and gas produced shows that the material used in producing 100 parts by weight of gas is approximately 18 parts of coal, 79 parts of air, and 4 parts of steam.

STATISTICS OF AMERICAN INDUSTRIES.—A special bulletin has lately been issued by the Census Bureau, from which the following abstracts of statistical tables are presented:

Agricultural implements: Number of establishments, 1943; capital invested, $62,109,668; average number of hands employed, 39,580; wages paid, $15,358,610; value of materials, $31,531,170; value of products, $68,640,486.

Ammunition: Number of establishments, 5; capital invested, $834,000; average number of hands employed, 1083; wages, $366,778; value of materials, $1,238,452; value of products, $1,929,966.

Brick and tile: Number of establishments, 5631; capital invested, $28,673,616; average number of hands employed, 66,155; wages paid, $13,443,532; value of materials, $9,728,630; value of products, $32,833,587.

Fire-arms: Number of establishments, 38; capital invested, $8,315,289; average number of hands employed, 4847; wages paid, $2,560,089; value of materials, $1,781,313; value of products, $5,618,636.

Lumber, sawed: Number of establishments, 25,708; capital invested, $181,186,122; average number of hands employed, 147,956; wages paid, $31,845,974; value of materials, $146,155,383; value of products, $233,367,729.

Paper: Number of establishments, 692; capital invested, $46,241,202; average number of hands employed, 24,442; wages paid, $8,524,855; value of materials, $33,931,297; value of products, $55,109,914.

THE CANADIAN PHOSPHATE TRADE.—The remarkable development of the Canada phosphate trade within the short space of about nine years is full of hope and promise for the future. In its first year, says the *Monetary Times*, much less than two hundred tons was exported, which in 1876 swelled to 2713 tons. The progress has been steady; for there were shipped in 1880 13,000 tons and 15,000 in 1881, while this year the export is expected to reach 20,000 tons. The prices obtained for this valuable mineral have varied a great deal since the inception of the trade in 1873. As low as nine dollars per ton has been paid for the article in the port of Montreal, and just now the prices range from $20 to $22 f. o. b. Montreal. The prices ruling in Liverpool for the last three years since the recovery of brisk trade in England have been as follows: January, 1880, 10d. per unit or percentage of phosphate; in January, 1881, prices advanced to 15d. per unit; while last January the figure of 17d. was reached. Now their prices are made on a basis of 75 per cent of phosphate of lime, which means that since January, 1880, prices have been $15, $22.50, and $25.50. Phosphates of high grade testing from 80 to 90 per cent are of course worth from five to fifteen units more. At 17d. per unit, a difference of $3.40 per ton is realized on a mineral running up to 85 per cent of the tribasic phosphate of lime.

There are improvements, says our contemporary, which might be introduced with advantage here, and they are in modes of mining and packing the article. Hitherto, few serious attempts have been made to mine the mineral in any systematic way. What is wanted is the rock-drill, in place of the little tinkering hand implements one meets with in many mines. There should also be mills located at some point convenient to the shipping stages, where the mineral might be passed through a milling process which would reduce it to the size of peas or corn. In this process, the mica and other impurities would be taken out and the grade of the phosphate would be raised. Now, as the average of these impurities would seldom exceed four per cent, it follows that the phosphate would be improved to that extent, and the value of the improvement would be four times 34 cents, which would give us $1.36 per ton.

GENERAL MINING NEWS.

ARIZONA.

TIP TOP.—The secretary informs us that the mill, which has been closed since July 15th, for the purpose of sinking the main shaft to a greater depth, started up November 10th.

COCHISE COUNTY—TOMBSTONE DISTRICT.

Recent reports state that the Contention and Grand Central companies are sinking a joint winze, to test the flow of water below the 600 level, using trial pumps. Large pumps will be completed and placed as soon as the flow has been proved. Luck Sure is still shipping to the smelter a large quantity of manganese ore assaying $20 per ton. Work is progressing on the Way Up mine, the same as before the injunction was granted by the court. Head Center and Tranquillity will soon resume work under the consolidation. In the Cumberland mine, near the Randolph, a body of chloride ore has been struck at a depth of forty feet. The ledge is now as wide as the shaft. The San Diego mine has been sold by the Woronoca Mining Company, and will shortly start up under a new organization.

GRAHAM COUNTY.

SUNSET.—A report states that a bonanza has been struck in the tunnel of this mine, 150 feet from the mouth.

MOHAVE COUNTY.

HACKBERRY.—The property is now owned by Indian Queen Mining and Milling Company. The mine is well opened, having a shaft 530 feet deep. A ten-stamp mill is on the ground, and by January 1st the Atlantic & Pacific Railroad will pass within a mile and a half of the mine.

PIMA COUNTY—SILVER BELT DISTRICT.

YOUNG AMERICAN COPPER MINING COMPANY.—Ten tons of ore have been sent to New York for reduction. Work upon the several lodes belonging to the company, distant about forty miles from Tucson, is reported to show a large quantity of high-grade ore.

PINAL COUNTY.

SPECIE PAYING.—The new tunnel of this mine, at Mineral Hill, is said to be all in ore. It runs on the ledge at the north end of the claim, over 100 feet below the highest croppings. Taking the ore and ledge-matter just as it comes from the tunnel, the average, by assay, is $42. The company proposes to erect a mill as soon as the mine has been thoroughly opened.

CALIFORNIA.

MONO COUNTY—BODIE DISTRICT.

The Bodie *Free Press* states that on December 2d attachments, amounting to $460,000, were placed on the Noonday, North Noonday, and Red Cloud mines by Wells, Fargo & Co.'s bank. This large sum, it is understood, has been advanced through the bank by Messrs. Haggin & Tevis to these corporations, in which they were large stockholders, over and above the amount derived from milling ores and from assessments during the past three years. The mines and mill are now in the hands of the sheriff, and have been closed down. The work of raising the pump columns in the Red Cloud shaft is now in progress. The stoppage of the Red Cloud pump is a very serious matter, as that has thus far drained the entire south end.

NEVADA COUNTY—GRASS VALLEY DISTRICT.

SOUTH YUBA CANAL AND MINING COMPANY.—The building of a new ditch to convey water for mining purposes, says the Foot Hill *Tidings*, has been begun by this company. This ditch will supply water to mines on Gold Flat and vicinity in this district, and also to the mines in the vicinity of Wolf Creek, Grass Valley District. It will have a capacity of 1500 inches, and cost the projectors not less than $20,000.

CENTRAL AMERICA.

NEW YORK & HONDURAS ROSARIA MINING COMPANY.—At the annual meeting of the stockholders, just held, the following gentlemen were elected directors: Walter T. Marvin, Isidore Valentine, Henry A. Appelius, S. Jacoby, Louis

Seidenbach, John J. Marvin, J. J. Valentine, Max Abenheim, and Walter McDermott.

COLORADO.

BOULDER COUNTY.

HORSFAL.—The Gail mill for the treatment of ore from this mine is nearly completed.

CLEAR CREEK COUNTY.

BULLION TUNNEL.—A contract is to be let immediately to drive this tunnel 400 feet toward the Cyclone lode. The tunnel has been driven about 400 feet. Two lodes have been cut, carrying ore of a very fair grade. It is the intention of the company to develop them actively, and to continue the tunnel to the Cyclone. It will have attained a length of 1250 feet when the latter is reached.

HUKILL GOLD AND SILVER MINING COMPANY.—A dispatch to the New York *Tribune* says that this property is to be sold by the sheriff. The sale is by virtue of four executions in favor of Anson P. Stevens, George E. McClelland, James Bowden, and John Priquet, respectively, which amount in the aggregate to $6204. The property levied on includes the mining claims of the company, "together with all buildings, machinery, and improvements situate upon" the claims described.

KOHINOOR.—This company has added a new battery of five stamps, five Frue vanners, and numerous needed improvements, besides extending the area covered by buildings considerably. The whole machinery is successfully running on Champion ore. The mill is run by water-power.

SNOWDRIFT.—The theory of Major Fulton, says the Georgtown *Miner*, that the workings on the lower tunnel level of this mine were not upon the same vein as the upper workings on what is called the Good Hope lode, but that it must be farther in the mountain, probably twenty or twenty-five feet north of the so-called Snowdrift level, has been proved true. It will be remembered that this level has been run 300 feet east of the tunnel in barren ground. A cross-cut was then run north, and this week at a distance of twenty-two feet the expected vein was cut, and has already been penetrated four feet. It discloses a two-inch streak of sulphurets from which four classes of ore were selected that ran respectively 840, 730, 620, and 214 ounces, the last specimen appearing to be only quartz without mineral. The vein will be crossed to the north wall, and then drifted on toward Good Hope Gulch. The ore found will probably average by mill-run 500 ounces and over.

GILPIN COUNTY.

The tramway constructed from the Iron mine to the 25-stamp mill of the Republic Mining Company is giving satisfaction and does away with wagon transportation. The track is so arranged as to run a loaded and empty car, a switch being provided in the center of the track. There are two cars used, each self-dumping, one having a capacity of one third of a cord, the other one fourth. The track is over 1000 feet in length, substantially constructed, and operated very economically. At the mine, these cars are run up to and under a dump slide which receives the ore as hoisted from the mine, and from which the cars are loaded. After loading and passing over the tramway to the stamp-mill, they run in from the main track on a curve and dump their loads in front of the mill batteries.

KEYSTONE.—Work is to be resumed at this mine.

GUNNISON COUNTY.

WASHINGTON GULCH.—A large amount of work has been done on the placer claims during the past season.

LAKE COUNTY.

Late Leadville exchanges contain the following:

CARBONATE HILL.—Considerable changes have been made at the Yankee Doodle mine, the property of this company. Instead of working through the shaft, an incline has been run from the surface, running in from the side-hill, and this has connected with the old workings. The entire length of the incline is about 600 feet. The mine is producing about 200 tons of ore a month, the grade being from 60 to 100 ounces of silver to a ton.

CATALPA.—The mine during November produced 420 tons of carbonate ore. The average value of the product was greatly below that of preceding months, and the net profits correspondingly smaller.

CHRYSOLITE.—It is reported that a proposition has been made to this company to do all the work on contract, the payment to be based on the tonnage extracted and hoisted from the mine.

HENRIETT.—The mine is now producing from seventy-five to eighty tons of ore daily, the shipments for the month of November amounting to 2244 tons. Since the pumps on the Big Chief, Clontarf, and Wolfe Tone, higher on the hill, have been stopped, more difficulty has been experienced in controlling the water, and consequently Mr. O. H. Harker, the manager, has put in a large Cameron pump at the end of the incline and has enlarged the steam capacity on the surface by the addition of two large boilers. This new machinery has started up.

HIGHLAND CHIEF.—The annual meeting was recently held in Leadville. The following directors were elected: J. B. Grant, Leadville; C. A. Manners, Leadville; Horace Steele, Painesville, O.; H. J. Boardman, Boston; J. A. Halsey, New York; Samuel McMillen, Leadville; Niels Larsen, Leadville; Tim Foley, Leadville; George C. Steele, Leadville. At a meeting of the board, officers were chosen as follows: J. B. Grant, President; C. A. Manners, Vice-President; Horace Steele, Secretary; George W. Trimble, Treasurer; George C. Steele, Assistant-Secretary and Agent. The financial standing of the company is fair, and the interest of the outstanding bonds has been paid regularly. It is probable that the company will renew the present lease of the old workings of the mine to Mr. George C. Steele. The company also contemplates working the property from the new shaft sunk a short time ago.

LEADVILLE CONSOLIDATED.—The mines of this company consist of the Carbonate, Shamrock, and Little Giant, a very small portion of which has yet been opened. The mine has for some months past been gradually improving, and now shows resources and prospects of great value. Last month, over three hundred tons of ore were shipped, giving a yield of about sixty-five ounces silver to the ton. The shipments will continue about the same.

MIKE & STARR.—The new pump is in place and is doing excellent work. The mine is free from water, and the extraction of ore is to begin immediately.

LARIMER COUNTY.

BUCKHORN.—A dispatch from Fort Collins says that the reported strike of a deposit of rich carbonates on this mine, at Crystal Mountain, some thirty miles west of here, has occasioned considerable excitement here and at Loveland.

OURAY COUNTY.

EMMA MOUNTAIN.—Arrangements are making to work the body of galena ore recently encountered in the Sidney mine. Drifting on the vein each way from the cross-cut is pushed with vigor, several tons of ore per day being extracted.

PARK COUNTY.

WYANDOTTE.—A contract is to be let immediately for a 200-foot tunnel, says the Denver *Tribune*, to cut the Wyandotte lead at a depth of 500 feet from the surface. Since the organization of the company and purchase of the property on the 15th of August last, a force of thirty men has been steadily at work. The ore runs principally in gold, and returns on different grades from $300 to $3000 per ton. This is but the beginning of more extensive operations by the company under the General Manager, A. E. Keables.

PITKIN COUNTY.

SPAR.—The suit pending for the possession of this mine has come to a close. The verdict was in favor of Messrs. Breed & Gillaspie. Active work on the mine will begin immediately.

SUMMIT COUNTY.

DELAWARE.—The cross-cut tunnel which was run to strike this mine, says the Georgetown *Miner*, has intersected the vein, showing four feet of solid gray copper and galena ore. There is considerable excitement over the strike. The ore is of a high grade, the iron and antimony which existed in the mineral having disappeared.

ROBINSON.—The Leadville *Herald* says that the regular ore-shipments are maintained at the rate of from thirty to forty tons a day, with an improvement in the grade of the ore, that which is now coming from the eleventh level running 48½ ounces in silver. The ore-faces also show improvement, and the new strike promises to open up in a very satisfactory manner.

DAKOTA.

CALEDONIA.—The superintendent reports, for the week ended December 3d: Ore delivered to mill, 1025 tons. Bullion shipped, 733½ ounces; value, $12,500. Will undoubtedly have better returns for December.

CUSTER.—The Black Hills *Democrat* reports that this mine has produced 31,000 pounds of mica during the last three years. Fourteen thousand pounds have been taken out this year, with an average working force of ten men.

MICHIGAN.—This mine, near Rawhide, was recently sold for $120,000.

FLORENCE.—The mill remains idle, owing to the non-arrival of new machinery ordered some time ago. Preparations are under way for firing up the smelter, which is expected to occur about the middle of the month. Colonel Davey has about one hundred men in his employ. A small force is at work in the Florence; but beyond the small pocket of chlorides encountered a week or so ago, nothing of value has been found. The workings are in quartzite, with here and there a seam.

GEORGIA.

CONSOLIDATED GOLD MINING COMPANY OF GEORGIA.—The foundation of the new sixty-stamp mill at the Ivey is about completed. The twenty-stamp mill is running on ore from the Ivey cut with good results.

IDAHO.

A correspondent of the Salt Lake *Tribune* writes from Bellevue that not much will be done in the mines this winter; but with thousands of tons of ore on the dumps at the different mines, and the ore in sight, the outlook for the coming summer is very flattering. The coming summer will see five smelters in successful operation in this district. Four are now completed, and one is building at this place.

KETCHUM SMELTER.—The works of the Philadelphia Smelting Company, at Ketchum, were closed for the season November 30th. It is intended to erect a third furnace of forty tons capacity next spring. Two furnaces will thereafter be kept in constant operation, and it is probable that the works will be run uninterruptedly summer and winter.

MAINE.

STEWART COPPER MINING COMPANY.—The annual meeting of the stockholders was held in Bangor recently. The following officers were elected for the ensuing year: President, Hon. F. M. Laughton; Directors, F. M. Laughton, J. S. Jenness, C. F. Bragg, F. W. Hill, Charles E. Hill, Thomas White, and Charles P. Wiggin. Following this meeting a directors' meeting was held, and Captain Dunn was elected superintendent. The prospects of the company are reported to be highly encouraging.

MEXICO.

It is reported that the formation of a company to reduce the immense quantity of low-grade ores on the dumps of the old mines near Chihuahua, and the contracting for the most improved machinery for the purpose, are damaging the prospects of reduction-works at El Paso, intended mainly for the same purpose.

MICHIGAN.

PEWABIC.—The *Northwestern Mining Journal* says that the appearance of this mine is very much improved. It is now in rich stamping ground. A mass of considerable size is uncovered.

MONTANA.

SILVER BOW DISTRICT.

The prospects of the different mines around Butte continue to be favorable. Work is pushed vigorously at all the mines, and the developments show very satisfactory results. Mr. William McCaskle, the adviser of Messrs. Haggin, Hearst & Tevis, is at present in Butte, examining the Anaconda and St. Lawrence mines, and considering with the company's superintendent the question of the location of the proposed smelting-works at Blackfoot, Warren Springs, or Divide. The cost of the machinery now erecting at the two mines is said to be almost $200,000.

PARROTT MINING AND SMELTING COMPANY.—The Butte *Miner* says that negotiations have been concluded by which this company assumes control of the Ramsdell, Parrott, and Shakspeare properties.

NEVADA.

ALBION.—About eight tons of piping for the flue-dust tunnels at the Albion, says the Eureka *Sentinel*, have arrived, and will be transferred to the mine and put in place as speedily as possible. Every thing is in order to receive the piping, and nothing will then prevent the two furnaces from being worked up to their full capacity. It is expected by the superintendent that in about ten days all the improvements will be completed and the mine put fully upon its merits.

BOSTON & EUREKA CONSOLIDATED.—The Eureka *Leader* reports that work started upon this property on December 1st. Prospecting is going on on the 200 level with favorable indications. The main shaft is to be sunk a hundred feet deeper, and work will be begun on it in the near future.

BULLION.—The Eureka *Sentinel* says that a suit has been entered by Hunning Thode against the company, and the following directors, David Porter, R. Hayes, Thomas Cole, A. J. McDonald, and W. L. Elliott, praying for an injunction restraining them from selling 30,353 shares of the capital stock of the corporation, and that the injunction be made perpetual.

COMSTOCK LODE.—Connection has been made between Mexican and Union Consolidated on the 2900 level. This opens for cross-cutting on that level 2000 feet in length of ground, extending from Sierra Nevada to the north line of California.

INDIAN QUEEN.—The secretary reports that a deep tunnel is running which will be 1455 feet long; at present, the tunnel is in 720 feet. The total bullion produced for the year is $183,650.39. November 1st, this company consolidated with the Hackberry Mining Company, of Arizona.

TYBO CONSOLIDATED.—Reports state that the company's mill started up November 23d, and is running satisfactorily. The 2-G mine furnishes its regular supply of ore.

NEW MEXICO.

The latest dispatches state that a rich float assaying as high as $30,000 gold per ton was recently found in the Socorro range, but the ledge is still undiscovered. A very heavy strike of gray sulphuret ore, assaying from $200 to $500 per ton, is reported to have been made recently on the Antelope claim, Palomas range, while doing assessment-work. Experts declare it to be on the line of the Perchas and Lake Valley mineral belt. Test assays of ore from the Copper Duke and Mountain Chief, adjoining mines, Organ Mountain District, show a general average of sixty-nine ounces silver to the ton. Thirty valuable locations in Grant County have been recorded in Silver City in the past thirty days. Several sales of mining properties in the Florida range have been made at fair prices. One claim showing ore carrying 50 per cent lead and $35 silver per ton was sold

for $10,000. A phosphate of lead mine has been found in the Caballo range. A copper smelter is going up in Hanover District.

UTAH.

HIDDEN TREASURE.—We have the following letter from Mr. V. M. C. Silva, dated Ogden, December 2d: Some eighteen months ago, a company was organized in New Jersey, called the Hidden Treasure Consolidated Mining Company, of Utah, of which Mr. George C. Warner was president, and the writer was superintendent. Not having any satisfactory information of the existence of said company for a long time, I desire to say that I do not wish my name used in connection with the so-called company. I know nothing of it.

Respectfully, V. M. C. SILVA.

The Salt Lake *Tribune*, in its weekly mining review, reports the following:

CRESCENT.—The operations continue, but the roads hinder full shipments, and the reduction of the ores at the Park City smelter is not yet in a perfect state. At Little Cottonwood, much activity is shown. The Juab Lawrence, at Alta, showed an output for the week of forty tons of marketable ore. The City Rocks has 2500 sacks of ore ready for shipment. The Flagstaff has let a contract to Sam Sleeman to sink the main shaft 100 feet deeper. The remuneration is said to be $20 per foot, every thing furnished by the company. The Reed and Goodspeed tunnel, Big Cottonwood, was in 1870 feet at last reports, and within 80 feet of the vein as calculated. The erection of the six new furnaces at Tintic, for the Mammoth operations, is going forward in good shape. The plans for the new refining-works will be set in operation vigorously. The output at the mine is about 200 tons per week, working thirty men, although much of the labor is in timbering and doing dead-work.

WISCONSIN.

A dispatch from Milwaukee reports that large deposits of iron and lead have been discovered in Jackson County.

MINERAL PATENTS GRANTED BY THE UNITED STATES LAND-OFFICE.

The following patents were issued during the month ended on the 4th instant:

ARIZONA.

TUCSON DISTRICT.

Laramie Silver Mining Company, upon the Whale, Mammoth, and Mountain Queen lodes. Gunsight Consolidated Mining Company, upon the Silver Grit, Eastern, and Gunsight lodes and mill-site. Morning Star & Crescent Consolidated Mining Company, upon the Morning Star and Crescent lodes. Robert N. Leatherwood *et al.*, upon the Yellow Jacket lode. Western Reserve Mining Company, upon the Justice and Frazier River lodes. Huachuca Mining and Smelting Company, upon the IXL and Wisconsin lodes. Silver Moon Mining Company, upon the Silver Moon lode. James B. Waller, upon the General Craig, Whilden, and Missouri lodes. Virgil W. Earp *et al.*, upon the First North Extension Mountain Maid lode.

CALIFORNIA.

THE BODIE DISTRICT.

Oro Mining Company, upon the Red Jacket quartz mine.

SACRAMENTO DISTRICT.

R. H. Floyd, upon the Last Chance quartz mine. Samuel Merritt, upon the Northern Extension Pittsburg mine. Lawrence Evans, upon the Pioneer quartz mine. J. Perrin *et al.*, upon the General Grant quartz mine. Yuba Gold Mining Company, upon the Jokkoree, Mayflower, and Hathaway quartz mines.

STOCKTON DISTRICT.

James Grant *et al.*, upon the Enterprise placer. Fresno Enterprise Company, upon the Enterprise quartz mine. James Grant, upon the J. Grant lode. William Walsh, upon the Arkansas Traveler lode.

COLORADO.

CENTRAL CITY DISTRICT.

John Hall *et al.*, upon the Little Casino lode. James Haggart, upon the James A. Garfield and Occidental lodes and mill-sites. D. McArthur, upon the Cedar Rapids lode. James P. Maxwell, coal. W. S. Hickox, upon the Wheeler Tunnel lode. Julia A. Dory, upon the Chemung County lode. George A. Mills, upon the Decatur lode. Champion Comstock Mining Company, upon the Comstock, Summit, Champion, and Champion Dirt lodes. Robert W. Scott, upon the Silver Belt lode. W. M. Fletcher *et al.*, upon the Crown Jewel, Hoodoo, and Josephine lodes and mill-sites Gladstone Gold and Silver Mining Company, upon the Gladstone lode. John R. Cleaveland, upon the Colfax and Schiller lodes. Joseph B. Johnson, upon the Commonwealth lode. John J. Eussen, upon the Berwick lode. Thomas H. Potter, upon the Golden Cloud lode. La Crosse Gold Mining Company, of Colorado, upon the Burroughs lode. Rudolph Wurlitzer, upon the Howard and Sylvia lodes and mill-sites. Thomas B. Bryan, upon the Old Hundred lode. Thomas Owens, upon the Golden Age lode. Frederick Kruse, upon the Humboldt lode. John S. Reid *et al.*, upon the Homestake lode. John Miller, upon the Foot & Simmons lode. Lebanon Mining Company, of New York. John M. Dumont, upon the Salisbury lode. William Morgan, upon the Invincible lode. Christopher C. Miller, upon the Hill House lode.

DEL NORTE DISTRICT.

I. McLean and T. H. Norton, upon their coal mine.

LAKE CITY DISTRICT.

Julius Thompson *et al.*, upon the Poverty lode. Grand View Mining Company, upon the Grand View lode. Rico Silver Mining Company, of Colorado, upon the Puzzler, Phœnix, Pelican, and Yellow Jacket lodes. A. Schiffer *et al.*, upon the Maple Grove lode and mill-site. W. E. Webb *et al.*, upon the Pekin lode. Joseph P. Hale, upon the Three Brothers, Commodore, Lake Como, Short Stop, Cashier, and Arcade lodes. Ira Holmes, upon the Mammoth lode. W. E. Webb *et al.*, upon the Black Horse lode.

LEADVILLE DISTRICT.

John Crouston *et al.*, upon the Key and Princeton lodes. Arthur D. Foote *et al.*, upon the Black and Ulster lodes. Frank D. Waugh *et al.*, upon the Donovan lode. James T. Clark, upon the Free American lode. Henry Cummings, Trustee, upon the Logansport lode. G. M. Mitchell *et al.*, upon the Lady Alice lode. N. R. Knight *et al.*, upon the Gladstone lode. D. Jackson *et al.*, Trustees, upon the Hercules lode. A. F. Pogue *et al.*, upon the Ogden and Peru Extension lodes. J. K. Hornish *et al.*, upon the Eldora and Wild Cat lodes. J. H. Kershaw, upon the Iron lode. Mike & Starr Gold and Silver Mining Company, upon the Thomas Starr and Mike lodes. Berlin Mining Company, upon the Tunnel and Henry D. lodes. James Garrett *et al.*, upon the Uncle Sam lode. J. G. Bronson, upon the Lalla Rookh lode. A. Mayfield *et al.*, upon the Hidden Treasure and Silver Bowl lodes. J. B. Henslee *et al.*, upon the Enterprise lode. H. B. Morse *et al.*, upon the Iron Queen lode. L. B. H. Brown, upon the Wonderful lode. Denver Rainbow Mining Company, upon the Denver and Rainbow lodes. George Jess, upon the Elegant lode. Meyer B. Haas *et al.*, upon the Palmetto & American Flag and Colorado No. 2 lodes. Crescent Mining Company, upon the J. R. Soper lode. Samuel R. Dimock *et al.*, upon the Shelby lode. Benjamin F. Darrah, upon the Ophir lode. Battle Mountain Smelting Company, upon the Polar lode and mill-site. W. J. Wilson *et al.*, upon the Mayflower lode. L. B. Wheat *et al.*, upon the Antimony lode. Hermann Hibschle *et al.*, upon the American Eagle lode. C. J. F. Schonfeldt, upon the Cornucopia lode.

PUEBLO DISTRICT.

Thomas J. Peter, coal. Portage & Silver Cliff Gold and Silver Mining Company, upon the Denver lode. W. R. Kirk *et al.*, upon the Penny Poker lode.

MONTANA.

HELENA DISTRICT.

W. H. Young *et al.*, upon the Nettie lode. Samuel T. Hauser, upon his coal mine. G. W. Farlin, upon the Humboldt lode. Lee W. Foster *et al.*, upon the Liquidator lode. J. P. Reins *et al.*, upon the Missouri and Enterprise lodes. E. G. Hesenden, upon the Nelson lode. John R. Sanford, placer. Henry Eiling *et al.*, upon the Keystone lode. Thomas C. Gorrie *et al.*, upon the Lamonta lode. Copper Company, upon the Crittenden and Calumet lodes.

UTAH.

SALT LAKE CITY DISTRICT.

Arnold Wall *et al.*, upon the Nellie Wall lode. Samuel W. Smith, upon the Grand Duke lode Thomas Venard, upon his coal claim. August Podlech, upon his coal claim. Oscar H. Hardy, upon his coal claim. E. A. Shean, upon the Clara No. 2 lode. Utah Consolidated Mining Company, upon the Lady Annie lode and mill-site. N. O. Springer *et al.*, upon the Red Fox lode. F. Little *et al.*, upon the Fairview lode. Charles Gooch, upon his placer. Henry Wagner *et al.*, upon the Sunday lode. Utah Consolidated Mining Company of Utah, Utah lode. Golden Treasure Mining Company, upon the Golden Treasure lode.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

GRANTED NOVEMBER 21ST.

267,661. Artificial Stone-Burning Kiln. Adam Baumann, Philadelphia, Pa.
267,675. Rotary Engine. Charles F. Cory, South St. Louis, Mo.
267,687. Ore-Crusher. William P. Hammond, Napa, Cal.
267,692. Oil and Water-Injector. Omar H. Jewell, Chicago, Ill.
267,697. Apparatus for Separating Gold and Silver from Gravel and Sand. John T. Long, Monsey, N. Y.
267,710. Electric Pumping Apparatus. Charles C. Peck and William H. Chapman Middlebury, Vt.
267,717. Manufacture of Ingot Iron and Steel. Jacob Reese, Pittsburg, Pa.
267,723. Process of Extracting Gold and Silver from their Ores. Charles A. Schaeffer, Ithaca, N. Y.
267,742. Process of Making Bronze Alloys. Pierre Dronier, Paris, France.
267,743. Method of Purifying Natural Waters for use in Steam-Boilers. Charles B. Dudley, Altoona, Pa.
267,746. Steam-Trap. Jerome B. Fuller and Dwight P. Mills, Naugatuck, Conn.
267,757. Automatic Guard for Elevators. Robert P. Rankin, Clayton, Ind.
267,768. Amalgamator. John W. Bailey, Denver, Colo., and Affonso de Figaniere, Philadelphia, Pa.
267,781. Calorifere. Friderich C. Eberley, and Rudolph Richter, Denver, Colo.
267,783. Machine for Grinding the Surface of Stone. Andrew Folsom, Warren, Assignor to himself and William D. Hilton, Providence, R. I.
267,792. Portable Steam-Engine and Boiler. Samuel E. Jarvis, Lansing, Mich.
267,814. Brick-Machine. Robert B. Wilson, Cincinnati, O.
267,818. Speed and Motion Regulator for Machines. Christ Adler, Milton Center, O.
267,819. Feeding Device for Blast and other Furnaces. William H. Allen, Pittsburg, Pa.
267,838. Sand-Drier. William W. Clark, Chicago, Ill.
267,841. Construction of Arches, etc. John H. Cruse, Felicity, O.
267,842. Process of and Apparatus for Extracting Gold from its Ores. Affonso de Figaniere, Philadelphia, Pa.
267,854. Turbine Water-Wheel. William B. Farrar, Greensborough, N. C.
267,879. Plating Metals. Carl Haegele, Geislingen, Wurtemberg, Germany.
267,880. Ingot-Mold. William Hainsworth, Pittsburg, Pa.
267,892. Vessel for Liquids. Thomas Houston, Bangor, Me., Assignor of one half to Hannibal H. Crocker and Julius H. Crocker, same place.
267,894. Pump. Joseph Inler, Forest, O.
267,907. Amalgamator. William H. Leininger, Salem, Oregon.
267,912. Drilling-Machine. Robert M. McDermott, St. Louis, Mo., Assignor to the McDermott Automatic Drill Company, same place.
267,946. Hydrocarbon-Engine. Amos S. Stetson, South Abington, Mass.
267,960. Runner for Casting Steel Ingots. Theodore G. Wolf, Scranton, Pa.

GRANTED NOVEMBER 28TH.

268,005. Rotary Engine. John T. Davis, New York City, Assignor to Orrill Davis and Louis J. Pomvort, same place.
268,029. Pulverizing-Machine. Frederick W. Krause, Chicago, Ill.
268,035. Furnace. John G. McAuley, New York City.
268,049. Specific-Gravity Apparatus. Théophile Sourbé, Bordeaux, France.
268,077. Device for Burning Petroleum. Richard A. Berry and Robert M. Bidelman, Adrian, Mich.
268,096. Gas-Retort Furnace. Henry C. Hann, Baltimore, Md.
268,098. Steam-Boiler Furnace. Willard T. Hatch, Indianapolis, Ind., Assignor to the Atlas Engine-Works, same place.
268,100. Exhaust-Steam Condenser for Steam-Pumps. William F. Holsing, Uniontown, Pa.
268,105. Elevator-Alarm. August C. Jacobi, Sand Creek, Wis.
268,115. Ore-Stamp Battery. James M. McFarland, Virginia City, Nev.
268,127. Apparatus for Coating Metals with Metal. Henry Roberts, Johnstown, Pa.
268,133. Apparatus for Washing out or Separating Soluble from Insoluble Substances. Hermann Schaede, Zeitz, Prussia, Germany, Assignor to the Zeitzer Eisengiesserei and Maschinenbau Actiengesellschaft, same place.
268,176. Hydrocarbon-Furnace. Virgil W. Blanchard, New York City.
268,195. Rotary Engine. John T. Davis, New York City.
268,208. Hoisting and Conveying Apparatus. Joseph Edwards and James R. F. Kelly, Brooklyn, N. Y.
268,210. Transmitting Power by Compressed Air. Alfred D. F. Farley, Leavenworth, Kan.
268,233. Elevator. Philip Hinkle, San Francisco, Cal.
268,259. Shield for Metal Rolls. Hugh McDonald, Alleghany, Pa.
268,277. Oven for Burning Pulverulent Fuel. Michel Perret, Paris, France.
268,299. Dumping-Car. Israel Shoudy, Jr., and Charles Atherton, Paw Paw Grove, Ill.; said Atherton Assignor of one third to said Shoudy.
268,325. Concentrator and Separator for Ores, etc. Elijah Warne, Easton, Pa.
268,351. Ore-Concentrator. Silas M. Atchison, San Francisco, Cal., Assignor of one half to Willard F. Arnold, same place.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Dec. 15.

The only new feature in the business at the Mining Exchanges this week is the listing of the stock of Sierra Grande, one of the Lake Valley mines, on the New York Board. The market was strong during the middle of the week, and a better feeling prevailed; but it was quickly dispelled yesterday and to-day, when weakness was the order of the day. Robinson experienced a sharp decline to-day, and Chrysolite also suffered. The Comstock shares were generally weak, in sympathy with the San Francisco market. The low-priced shares were all generally active at about steady prices. Silver Cliff has suffered a decline under large transactions. The total sales of mining shares at all the Exchanges aggregate 354,629 shares, as against 399,599 last week.

The Comstock shares have been moderately active, but at weak prices. California sold at 10@5c. (assessment unpaid), with a business of 10,435 shares. Consolidated Virginia had a fair business at irregular prices, selling at 61@65@59c. Sierra Nevada was quiet and a little weak, selling from $4@$3.50. Ophir sold at $2.75, with one transaction of 100 shares. Best & Belcher was a little weak at $4.50@$4.25, under a very small business. Sutro Tunnel had an active business at weak prices; it sold from 22@17@20c., with a business of 14,050 shares.

The Leadville stocks were rather quiet at about steady prices. Amie Consolidated was quiet and steady at 10@9c. Chrysolite records a very active business, and was strong during the week, but fell off some to-day; it has sold from $1.05@$1.30@$1.15, closing at the latter figure. Dunkin, with one trans

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	SHARES. No. in 1000's	SHARES. Par Value.	ASSESSMENTS. Levy to date in 1000's.	ASSESSMENTS. Date and amount per share of last.	DIVIDENDS. Total paid to date in 1000's.	DIVIDENDS. Date and amount per share.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. Dec. 9. H.	Dec. 9. L.	Dec. 11. H.	Dec. 11. L.	Dec. 12. H.	Dec. 12. L.	Dec. 13. H.	Dec. 13. L.	Dec. 14. H.	Dec. 14. L.	Dec. 15 H.	Dec. 15 L.
Alice, Mon..	400	25	*		400	De 81 10	2.00								1.75		1.80	
Amie Con., Co.	500	10	*		305	My 80 10	.10	.09	.09		.09		.09		.09			
Atlantic, Mich.	40	25			140	Fe 82 2 00												
Argenta, Ne.	100	100	225	No 82 25	40	Fe 80 20												
Bar & Walker, Ut.	100	10	*		60	No 80 10												
Bassick, Co.	100	100	*		25	Fe 80 25												
Belle Isle, Ne.	100	100	65	My 82 10	300	De 79 25					.50							
Black Bear, Ca.	30	100	15	Se 79 50	889	Se 82 30												
Belcher, Ne.	104	100	2562	Se 82 25	15397	Ap 76 1 00												
Bodie Cons., Ca.	100	100	125	De 81 50	1295	No 82 2 00			2.50		2.25							
Bos'n & Mon. Mon.	200	10			300	De 82 05												
Breece, Co.	200	25	*		2	Fe 80 1												
Bulwer, Ca.	100	100	80	De 77 50	130	De 82 10	1.25	1.20	1.25		1.25				1.25	1.20	1.20	
California, Ne.	540	100	638	No 82 20	31320	De 79 50	.10	.09	.10	.08	.10	.08	.09	.07	.10	.05	.06	.05
Cal. & Hecla, Mich.	100	25			22350	No 82 5 00												
Caribou Con., Co.	100	10	*		50	Mr 80 10												
Caro'ina Q'n, N.C.	100	100			8	Oc 82 02												
Castle Creek, Id.	100	1			21	De 82 03												
Cataipa, Co.	300	10	*		210	De 82 10												
Chrysolite, Co.	200	50	*		1600	De 81 50	1.25	1.05	1.25	1.20	1.30	1.25	1.30	1.25	1.25	1 15	1.15	
Climax, Co.	200	10	*		180	Au 80 30					.04	.02					.04	.03
Cons. G. Mg., Ga.	100	5	*		64	Au 82 04												
Cons. Va., Ne.	540	100	897	Au 82 30	42930	Au 80 50	.65	.61	.65	.58	.65	.62	.65		.65	.58	.66	.59
Copper Queen, Ar.	250	10	*		500	Se 82 50									5.25			
Crown Point, Ne.	100	100	2673	Fe 82 25	11588	Ja 75 2 00												
D'dw'd-Terra, Dk	200	25	*		880	De 82 10												
Dunkin, Co.	200	25	*		200	Ju 81 7½					.20							
Eureka Cons., Ne.	50	100	100	My 76 1 00	‡	Jy 82 25					10.50				11.25			
Evening Star, Co	50	10	*		1225	Oc 82 50												
Excelsior, Ca.	100	100	300	Ja 82 1 00	875	Oc 80 25												
Fa. de Sinet, Dk.	100	100			510	No 82 20												
Findley, Ga.	200	1	*		8	My 79 1¢												
Freeland, Co.	200	25	*		50	My 80 25												
Glass-Pend., Co.	250	20	*		25	My 81 10												
Gold Stripe, Ca.	150	10	*		76	Jy 81 15											.06	
Gold & Curry, Ne.	108	100	3473	Se 82 50	3826	Oc 70 $10												
Grand Prize, Ne.	100	100	420	No 82 25	450	Se 80 25												
Great Eastern, Dk	300	1	*		16	Jy 80 01	.10											
Gr. Mountain, Ca.	125	10	*		212	No 81 7½	.29						.30		.32		.35	
Hale & Nor., Ne.	112	100	4006	Se 82 50	1598	Ap 71 5 00												
Hall-And's'n, N.S.	150	1			7	Ja 82 05			1.40		1.85		1.75		1.55		1.80	1.60
Hecla Con., Mon.	30	50			387	No 82 50												
Hibernia, Co.	300	25	*		180	Jy 81 40					.02							
Homestake, Dk.	100	100	200	Ap 78 1 00	1762	De 82 40			17.50									
Horn-Silver, Ut.	400	25	*		1700	No 82 75	6.00	5.75	5.63		5.88	5.75	6.00	5.88	5.88		5.75	5.63
Hukill, Co.	200	5	*		210	De 78 10	.08				.06						.06	
Indep., Ne.	100	100	185	Fe 82 15	225	Se 79 05			.73	.71	.75	.73	.80	.75	.78	.75	.75	
In. Queen, Ne.	125	2	12	No 79 10	355	Se 82 02												
Inyo, Ca.	100	5	*		45	Ap 82 05												
Iron Silver, Co.	500	20	*		910	De 82 20	2.55	2.50	2.55		2.60		2.65	2.60	2.65		2.60	
Jocuistita, Mex.	100	100			750	No 82 1 00												
La Plata, Co.	200	10			610	Se 82 30												
Leadville C., Co.	400	10	*		250	No 82 05	.60	.58									.60	
Leeds, Ut.	60	100	87	Ju 82 50	78	Oc 78 15												
Little Chief, Co.	200	50	*		700	Au 80 50	.40	.36			.46	.39	.45	.38	.43	.40	.43	.40
Little Pitts., Co.	200	100	*		1350	Mr 80 50	.70	.67			.80	.76	.67		.70	.69	.69	
Martin White, Ne	100	100	950	Se 82 25	90	Jy 79 30					2.50							
Moose, Co.	200	10	4		550	Mr 78 25	.04											
Morning Star, Co.	100	10			540	No 82 25												
Navajo, Ne.	100	100	235	Mr 82 20	100	De 82 25	6.87		7.00	6.88	7.13	6.75	6.75				7.00	6.88
N. Y. & Colo., Col.	50	20			25	Jy 79 10												
N'h'n Belle, Ne.	50	100			2300	No 82 50					10.63						9.38	9.13
N. Belle Isle, Ne.	100	100	55	Se 82 15	45	Se 82 15	.15				.20		.16	.15				
Ontario, Ut.	150	100			485.0	De 82 50	36.00		36.50									
Ophir, Ne.	100	100	3395	Jy 82 1 00	1595	Jy 82 1 00									2.75			
Osceola, Mich.	50	25			810	Se 82 1 00												
Plumas, Ca.	100	10	*		151	Jy 79 8												
Quicks. Pref., Ca.	43	100			654	Ju 82 6 00							9.50	9 00				
" Com., Ca.	57	100			151	Ju 82 40												
Quincy, Mich.	40	25			3230	Au 82 5 00												
Rising Sun, Ca.	150	5			52	My 81 7½	.06				.05							
Robinson C., Co.	200	50	*		575	No 81 50	1.20	1.10	1.30	1.10	1.35	1 30	1.35	1.25	1.25	1.20	1.25	1.10
Robt. E. Lee, Co.	500	500			50	Jy 81 10												
Savage, Ne.	112	100	5748	No 82 50	4460	Ju 69 3 00												
Sierre Grande															5.13	4.75	4 90	4.85
Sierra Nev., Ne.	100	100	5150	De 82 1 00	102	Ja 71 1 00	4.00		3.65	3.60			3.50		3.50		3.50	
Silver King, Ar.	100	100			1225	De 82 25					12.00							
Silver King, Co.	500	2			50	Au 81 10												
Socorro, N. Mex.	2.5	100			4	Mr 82 ¾												
Spr'g Valley, Ca.	200	1	*		50	Ja 81 25												
Standard, Ca.	100	100			4025	De 82 25	6.25						6.25				6.25	
Starr-Grove, Ne.	200	10	*		160	Ju 81 10												
Stormont, Ut.	200	1	*		155	No 81 05												
St. Joseph, Mo.	100	10	*		390	De 82 20												
Tip Top, Ar.	100	100	17	Mr 80 50	100	No 81 20												
Tombstone, Ar.	500	25	*		1350	Ap 82 10												
Vizina, Ar.	200	25			140	Mr 82 10					1.00							
Yellow Jacket	120	100	5358	Fe 82 1 00	2184	Au 71 2 50												

* Non-assessable. † The Deadwood has previously paid $275,000 in eleven dividends, and the Terra $75,000. ‡ 48175.

SALES.—Alice, 400; Amie Consolidated, 4100; Belle Isle, 200; Bodie Consolidated, 200; Bulwer, 1000; California, 10,435; Chrysolite, 15,600; Climax, 2400; Consolidated Virginia, 8880; Copper Queen, 100; Duncan, 200; Eureka Consolidated, 150; Gold Stripe, 500; Great Eastern, 1000; Green Mountain, 1200; Hall-Anderson 5200; Hibernia, 1000; Homestake, 10; Horn-Silver, 1585; Hukill, 1000; Independence, 4200; Iron Silver, 3800; Leadville Consolidated, 400; Little Chief, 15,064; Little Pittsburg, 1300; Martin White, 100; Moose, 200; Navajo, 2050; Northern Belle, 160; North Belle Isle, 1100; Ontario, 225; Ophir, 100; Quicksilver, Common. 300; Rising Sun, 1400; Robinson, 55,375; Sierra Grande, 18,800; Sierra Nevada, 375; Silver King, 40; Standard, 230; Vizina, 100. Dividend shares sold, 160,479.

action, sold at 20c., under a business of 1000 shares. Iron Silver had a fair business at strong prices, selling from $2.50@$2.65@$2.60. Leadville was quiet and steady at 58@60c. Little Chief was very active at irregular prices; it sold from 36@46@40c. Little Pittsburg, under a small business, was very irregular, selling from 67@80@69c. Climax sold at 2@4c., with transactions of 2400 shares.

The Bodie stocks were very quiet at steady prices. Bodie Consolidated sold at $2.50@$2.25. Standard was strong, under a small business, selling from $6.13@$6.25. Bulwer sold at $1.25@$1.20, with a business of 1000 shares.

The Tuscarora stocks had a moderate business at steady prices. Tuscarora was quiet and irregular at 7@10@7c. Belle Isle sold at 50c., with a transaction of 200 shares. Navajo had a fair business at irregular prices, selling from $7.13@$6.75@$7. Independence was quiet and steady; it sold from 71@80@75c. North Belle Isle, under a small business, was a little weak, selling from 20@15c.

In the miscellaneous list, the Green Mountain stocks were very quiet at steady prices. Green Mountain sold at 29@35c.; Rising Sun, at 6@5c.; and Cherokee, at 5@6c. Hall-Anderson had a fair business, but was weak, selling from $1.90@$1.55@$1.80. Horn-Silver was quiet at irregular prices; it sold from $5.63@$6@$5.63. Robinson Consolidated has been quite active at very irregular prices, and was quite weak to-day; it has sold from $1.10@$1.35@$1.10, closing to-day at $1.15. Sierra Grande, one of the Lake Valley mines, sold for the first time on the New York Mining Exchange this week. It was quite active and strong, selling from $4.75@$5.13@$4.90, with transactions of 18,800 shares. Prussian was also strong, selling at $5.25@$5.88. Alta-Montana was quiet and steady, selling at 18@16c. Barcelona continues very active on the American Board at strong prices; it sold at 21@25c. Bradshaw has been quite active at prices a little weak, selling from 44@40c. Calendonia (B. H.), under a small business, has been a little weak, selling from $1.50@$1.25. Decatur records a very active business at steady prices; the sales aggregate 13,000 shares at 7@9c. Durango was quiet and steady at 9@8c. Oriental & Miller has been more quiet than usual, but continues steady; it sold at 12@14c. Rappahannock, with a moderate business, was steady at 11@10c. Silver Cliff has been very active, but has been weak; it sold from 44@33@34c., with a business of 10,300 shares. South Pacific has been active and steady at 8@9c. The State Line stocks have been almost neglected, only a block of 1000 shares of Nos. 2 and 3 being sold during the week, and that at 8c.

As will be seen by reference to our mining news, Noonday has collapsed entirely. Only a few weeks ago, the secretary, Mr. William J. Taylor, published a statement, speaking in an encouraging manner of the prospects of the company, but making no mention whatever of its heavy debt. The mine had fallen behind $33,000 during the six months ended September 30th, and on the 2d of this month an assessment of $1 per share was levied on the Noonday, the North Noonday, and the Red Cloud, adjoining properties, all under the same management. Wells, Fargo & Co. have taken out attachments against the Noonday for $175,000, for a similar amount against the North Noonday, and for $110,000 against the Red Cloud.

Green Mountain matters appear to be getting into better shape. While in September the disbursements were $3000 above receipts, October showed only a deficit of $1500, and in December the mine fell behind only $800, of which one-half was cost of freight on a compressor. This comparatively good showing is largely due to the strict economy of the new management, and probably also to an improvement in the grade of the ore About $8500 have been subscribed for mortgage bonds, and it is believed that after the arrival of Vice-President Vernam, who is expected in a day or two, some arrangement among the large stockholders to take the rest of the mortgage bonds will be arrived at. Development-work is pushed.

Proceedings have been instituted in the Superior Court by the directors of the Columbia Consolidated Gold and Silver Mining Company for its voluntary dissolution upon the ground of insolvency. The directors state in their petition that the principal creditor of the company is Edward S. Stokes, the indebtedness to him amounting to over $50,000.

MEETINGS.

Arizona Consolidated Mill and Mining Company. Annual meeting of stockholders at the Metropolitan Hotel, January 1st, at twelve M.

Houghton Mineral Land and Mining Company. A special meeting of stockholders for the purpose of adopting a code of by-laws for the company and to act upon the question of the sale of all or any part of the real estate of the company. At the company's office, Room 10, 32 Pine street, January 16th, at eleven A.M.

San Juan & New York Mining and Smelting Company. Annual meeting of the stockholders and election of trustees at the office of Spencer, Trask & Co., 70 Broadway, January 3d, at three P.M.

Stormont Silver Mining Company. Annual meeting of the stockholders at the company's office, No. 2 Nassau street, January 2d, at two P.M.

Wood River Gold and Silver Mining Company. Meeting of stockholders to take into consideration and vote upon the question of selling and conveying upon terms to be agreed upon the property belonging to the company in Mineral Hill Mining District, Alturas County, Idaho, the Bullion, Ophir, Evergreen, and May Queen mining claims, or any of the same. At the company's office, Salt Lake City, Utah, February 7th, at ten A.M.

DIVIDENDS.

The Contention Consolidated Mining Company, of Arizona, has declared its regular monthly dividend (No. 11) of twenty-five cents per share, payable December 28th, at the office of the Farmers' Loan and Trust Company, on all stock registered in New York. Transfer-books close December 18th.

The Deadwood-Terra Mining Company, of Dakota, announces its twenty-fifth dividend (for November), amounting to $20,000, payable at the office of the transfer-agents, Messrs. Lounsbery & Haggin, No. 18 Wall street, on December 20th. Transfers close on December 15th.

The Gem Mining Company, of Colorado, will pay an extra dividend of one per cent on its capital stock, December 20th, 1882, to shareholders of record 18th instant.

NON-DIVIDEND PAYING MINES.

NAME AND LOCATION OF COMPANY.		NUMBER OF SHARES.	Par.	ASSESSMENTS. Total levied to date.	ASSESSMENTS. Date and amount of last.		HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. Dec. 9. H.	Dec. 9. L.	Dec. 11. H.	Dec. 11. L.	Dec. 12. H.	Dec. 12. L.	Dec. 13. H.	Dec. 13. L.	Dec. 14. H.	Dec. 14. L.	Dec. 15. H.	Dec. 15. L.
Advance							30c		30c		30c		30c		30c		30c	
Albion, s. L	Nev.	150,000	100	397,500	Jun. 82	25												
Allouez	Mich																	
Alpha	Nev.			420,000	Mar. 82	50												
Alta	Nev.	100,800	100	1,341,600	May 82	50												
Alta-Montana, G	Mon.	500 000	10	*			16c		17c		17c		17c		18c		16c	
Am. Flag, s	Colo	125,000	10	300,000	Jun. 77	25												
Barcelona, G	Nev	200,000	25	*			25c	22c	23c	21c	23c	22c	25c	23c	25c	23c	25c	
Battle Creek																		
Bear Creek	Cal..	300,000	1															
Beauce																		
Bechtel Con., G	Cal.	100,000	100	175,000	Oct. 82	10												
Best & B'lcher, G. &	Nev.	100,800	100	1,345,790	No. 82	50	4.25		4.25		4.50		4.25		4.25			
Big Pittsburg, S. L	Colo	200,000	100	*														
Black Jack, G	Cal.	100,000	2½															
Bonanza Chief	Mon	1,000,000	1	*														
Bondholder	Colo	200,000	2½															
Boston Con., G	Cal..	100,000	100	95,000	Oct. 82	25												
Boulder Con.																		
Bradshaw, s	Ariz	225,000	10				44c	42c	44c	43c	44c	42c	43c	40c	42c	41c	41c	40c
Buckeye	Colo	100,000	5	*														
" pref																		
Bull-Domingo, S L	Colo	200,000	50	*														
Bullion, G. S	Nev.	100,000	100	3,747,000	Oct. 82	50												
Bye and Bye	Ariz	100,000	10	*														
Calaveras, G	Cal..	500,000	1	*														
C'lav'r's W.&M.Co	Cal..																	
Cal., B. H., G	Dak.	100,000	100	480,000	Au. 82	15			1.50				1.35	1.25				
Carbonate Hill, S L	Colo	200,000	10				73c		78c						85c			
Catskill, S	Nev.	300,000	5															
Central Ariz'na, S	Ariz	100,000	100				49c						50c	41c				
Chapparal	Cal..																	
Cherokee, G	Cal.	150,000	10										5c				6c	5c
Chollar					Sep. 82	50												
Clarence	Can.																	
Colorado Cent'l, S	Colo	300,000	10															
Col'mb'a Con., G. S	Nev.	100,000	50															
Cons. Imp'ri'l, G. S	Nev.	500,000	100	1,425,000	Jan. 82	10												
Con. Pacific, G	Cal.	60,000	100	141,000	Au 82	25												
Crescent, S L	Colo	300,000	10	*														
Crowell, G	N. C.	50,000	1															
Dahlonega, G	Ga.	250,000	1	*														
Dardanelles, G	Cal.	100,000	10															
Decatur							9c	7c	9c	7c	8c	7c	9c	8c	9c	8c	9c	
Dunderberg, S	Colo	150,000	10	*														
Durango, G	Dak.	500,000	1	*							9c		9c	8c	8c		8c	
Eastern Oregon																	1.55	1.50
Elko Cons									10c		9c							
Empire, S	Ut'h	100,000	100														1.05	1.00
Enterprise	Colo						57c		57c		57c		60c		60c	59c	59c	
Exchequer	Nev	100,000	100	630,000	Jan. 82	25												
Globe Copper	Ariz.																1c	
Gold Placer, G	Colo	200,000	25	*														
Goodshaw, G	Cal..	100,000	100	200,000	Oct. 82	10	5c		5c		5c		11c	6c				
Granville, G	N. C.	300,000	1	*														
Harshaw, S	Ariz	100,000	100															
Head Center, S	Ariz	100,000	100	160,000	May 82	20												
Hortense, S	Colo	200,000	10								12c							
Index	Cal..																	
Julia, G S	Nev.	110,000	100	1,394,000	Jan. 82	20												
Kossuth, G S	Nev.	108,000	100	421,200	Aug. 77	15												
Lacrosse, G	Colo	100,000	10	*							15c							
Leviathan, S	Nev	100,000	100	380,000	Sep. 82	25												
Lucerne, S	Colo	500,000	10	*														
Mariposa Pref., G	Cal.	50,000	100	1,687,500	Dec. 81													
" Com., G	Cal.	100,000	100	1,950,000	Feb. 82													
May Belle, G	Cal.	100,000	100	84,000	Dec. 81	20												
Mayflower, S	Colo	100,000	100	*														
Mexican, G. S	Nev.	100,800	100	2,146,600	Oct. 82	$1					4.25	3.90						
Michoacan Synd	Mex.																	
Miner Boy, G S L	Colo	500,000	10	*														
Miller	Nev.	200,000	25															
Mono, G	Cal.	50,000	100	525,000	Oct. 82	25												
Moose Silver, S	Colo	300,000	10															
Nevada Syndi																		
North Standard, G	Cal..	100,000	100	20,000	Nov. 81	10												
N. Horn-Silv'r, S L	Utah	400,000																
Noonday	Cal..	60,000	10	208,000	Dec. 82	$1												
Old Dominion, C	Ariz	200,000	100	*														
Oriental	Nev.	200,000	10															
Ori'nt'l & Miller, S	Nev.	400,000	25				13c	12c			13c		14c		13c		14c	13c
Overman, G S	Nev.	115,200	25	3,604,700	May 82	25												
Potosi	Nev.	112,000	100	500,640	Nov 82	25												
Prussian													5.25		5.75	5.50	5.88	
Quartz Creek			100						4c						3c		3c	
Rappahannock, G	Va..	250,000		*			11c				10c		10c		11c		10c	
Red Elephant, S	Colo	500,000	1	*														
Retort			10															
San Pedro, G S L	N. M	400,000																
Silver Cliff, S	Colo	200,000	25	*			44c	43c	43c	42c	42c	38c	38c	35c	36c	33c	34c	
Silver Islet	Can.		50															
Sonora Con	Mex.																	
South Bodie, G	Cal.	100,000		100,000	Mar. 82	15												
South Bulwer, G	Cal.	100,000	100	195,000	May 81	25												
South Hite	Cal..	100,000	100		May 82	10					15c	14c						
South Pacific	Cal..		5				9c	8c	9c	8c	9c	8c	9c	8c	9c		8c	
State Line No. 1, S	Nev.	200,000	1															
" No. 2, S	Nev.	200,000	25															
" No. 3, S	Nev.	200,000	25															
" No. 4, S	Nev.	200,000	25															
" Nos. 1 & 4, S	Nev.		25															
" Nos. 2 & 3, S	Nev.						8c										9c	
Sutro Tunnel	Nev.	2,000,000		*			22c	20c	21c	20c	21c		21c	20c	21c	17c	20c	19c
Taylor-Plumas			10				18c	16c	17c		17c		16c		16c	15c	18c	17c
Tioga, G	CC.	100,000		285,000	Oct. 82	10												
Tuscarora, S	Nev	100,000	100	110,000	Oct. 81	15	7c		10c	8c	9c	8c	9c	8c	8c		8c	7c
Unadilla, S	Ariz	500,000	100	*														
Union Cons., G. S	Nev.	100,000	1	1,460,000	Oct. 82	$1	4.50		4.00		4.50	4.40			4.00			
Utah		20,000	100	1,340,000	Oct. 82	$1												
Vandewater	Nev.	200,000	100	*					20c	19c	24c		31c	28c	36c	33c	32c	
Washington	Ariz.	200,000	10				11c		11c		11c		11c		11c		11c	
Whalen Copper	Nev.	100,000	25															
Wide West																		
Willshire	Cal..	50,000	5	*														

SALES.—Advance, 1700; Alta-Montana, 1220; Barcelona, 21,500; Best & Belcher, 400; Bradshaw, 11,300; Caledonia, B. H., 400; Carbonate Hill, 500; Central Arizona, 700; Cherokee, 1200; Decatur, 13,000; Durango, 1200; Eastern Oregon, 300; Empire, 300; Elko Consolidated, 3200; Enterprise, 9500; Globe Copper, 900; Goodshaw, 3200; Hortense, 100; Lacrosse, 200; Mexican, 110; Oriental & Miller, 6500; Prussian, 400; Quartz Creek, 3000; Rappahannock, 3800; Silver Cliff, 10,300; South Hite, new, 800; South Pacific, 22,900; State Line, Nos. 2 & 3, 1000; Sutro Tunnel, 14,050; Taylor-Plumas, 35,000; Tuscarora, 6100; Union Consolidated, 470; Vandewater, 9800; Washington, 9100. Non-dividend shares sold, 194,150. Total shares sold at all the Exchanges, 354,629.

The Henriett Mining and Smelting Company, of Colorado, has declared its first dividend, of two per cent on the capital stock, aggregating $30,000, payable at the London office, December 1st.

The Homestake Mining Company, of Dakota, has declared its November dividend of forty cents per share, payable at Messrs. Lounsbery & Haggin's, No. 18 Wall street, on December 26th.

The Idaho Mining Company, of California, has declared a regular monthly dividend of $2.50 per share, amounting to $7750, payable on demand.

The Iron Silver Mining Company, of Colorado, has declared dividend No. 9, of twenty cents per share, payable at the office, No. 12 Wall street, Tuesday, December 26th. This makes the total amount of dividends $900,000.

The Silver King Mining Company, of Arizona, has declared a dividend of twenty-five cents per share.

The St. Joseph Lead Company, of Missouri, has declared a quarterly dividend of two per cent on the capital stock (22d dividend), payable December 20th. Transfer-books will close on the 15th, and reopen on the 20th.

REVIEW OF THE SAN FRANCISCO MARKET.

The Comstock shares in the San Francisco market continue very dull, and have been a little weaker. There is no important news from the mines. The outside dividend-paying stocks are now the principal attraction in this market, and are held firmly, holders declining to sell at the ruling prices. The Tuscarora stocks are the favorites.

SAN FRANCISCO MINING STOCK QUOTATIONS.
Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. Dec. 8.	Dec. 9.	Dec. 11.	Dec. 12.	Dec. 13.	Dec. 14.
Alpha	1	1	1	1⅛	1¼	
Alta	12-32	11-32	11-32	13-32	13-32	13-32
Bechtel	5-32	5-32				
Belcher	¾	13-16		13-16	27-32	¾
Best & Belcher	4⅛	4¼	4½	4¼	4¼	4
Bodie	2¼	2¼	2¼	2¼	2¼	2¼
Bullion	13-16	1⅛	1⅛	1	27-32	1
Bulwer			1			
California	3-32	3-32	3-32	3-32	3-32	1-16
Chollar	1⅛	1⅛	1⅛	1⅛	1⅛	1⅛
Con. Virginia	21-32	19-32	19-32	19-32	9-16	19-32
Crown Point	1	1⅛	1¼	1⅛	1⅛	1¼
Eureka Con	10½		10½		10¼	10
Exchequer	¼	5-16	5-16	11-32	5-16	5-16
Gould & Curry	2¾	2¾	2⅞	2¾	2⅞	2½
Grand Prize	3-32	3-32	11-32	11-32	5-16	
Hale & Norcross	1¼	1¼	1½	1⅜	1⅜	1⅜
Manhattan						
Martin White	2½	2½	2¼	2½	2	2¼
Mexican	4⅛	4⅛	4⅛	3⅞	3⅞	3⅜
Mono			5-16	5-16	5-16	¼
Mount Diablo		3¾	4		4	
Navajo	6½	6⅝	6⅞	6¾	6⅝	6½
Northern Belle	10		10	9¾	9¾	9½
Noonday			1-16			
Ophir	2¾	3	2⅞	2⅞	2¾	2¾
Oro						
Overman			3-16	3-16		
Potosi	1¼	1¼	1¼	1¼	1¼	1¼
Savage	1	1	1¼	1⅛	1	1⅛
Scorpion	11-16	11-16			21-32	21-32
Sierra Nev	3¾	4	3¾	3¾	3½	3⅜
Silver King		11½		10½		10½
Tip Top						
Union Con	4⅜	4⅜	4½	4¼	4⅛	3¾
Wales Con		3-16				
Yellow Jacket	1¼	1¼	1½	1½	1½	1⅜

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

BOSTON, Dec. 14.

The market for mining stocks continues to rule dull and without any special feature. The copper stocks are fairly steady in prices, and in one or two instances an advance is noted from last week's quotations; but the business is confined to small lots, and principally bought for investment. The speculative element is wholly wanting, and there is no outlook in the near future for the holders of this class of stocks. Calumet & Hecla holds steadily at $250; a small lot sold as high as $251, but later sales were made at $250½. Franklin sold at $14 regular, and $14¼ buyer 60 days. Pewabic ruled dull at about $13, with sales of small lots at $11@$12½. Quincy has been the principal feature in the market, and shows an advance from $60¼@$64, with sale of one share to-day at $64½, and closing at $64 bid. Atlantic declined from $16½@$16¼, on sale of a lot of 250 shares. Osceola sold at $33½, and later at $32 ex dividend ($1 per share). Huron, sale of small lot at $2.

In silver stocks, Bonanza declined from $3@$2⅜, with an advance in later sales to $2⅝@$2 9-16. About 2000 shares changed hands at these figures. Catalpa and Crescent have been extremely dull, the former at 87½c., and the latter at 30c. Harshaw sold at 50c., San Pedro at 25c., and Sullivan at $1 1-16. A small lot of Silver Islet sold at $7.

There is no peculiar feature at the Boston Mining Exchange, although a fair amount of business is daily transacted in the several specialties, but the changes in quotations are very slight. In the miscellaneous stocks, there is a growing business, and this feature bids fair to aid in the future prosperity of the Exchange. On the 1st of January next, the Exchange removes to the rooms of the Boston Board of Trade, and each member becomes a subscriber to the Board of Trade, with all the privileges attached thereto, and this it is believed will be of great benefit to the Exchange and materially increase the value of the membership.

3 P.M.—There was no material change in prices at the afternoon Board. Bonanza sold at $2⅜; Calumet, at $251; Franklin, at $14; Quincy, at $64; Osceola, $32 bid; Atlantic, $16¾ bid, $17 asked; Pewabic, $11¾ bid, $13 asked; Huron, $2 bid; National, $1 7-16 bid; Silver Islet, $6 bid; Sullivan, $1@$1¼; Catalpa, 85@87½c.; Crescent, 30c. bid.

METALS.

NEW YORK, Friday Evening, Dec. 15.

Copper.—The market has weakened further, and we hear of small sales of Lake copper at 17⅛c., which now fails to tempt buyers, who decline to go higher than 17¾c. Western Copper, too, has been sold lower, at 17¼c., and here, too, only lower prices can induce buyers to take hold. We quote, nominally, 17⅛c. for Lake and 17¼c. for Western copper. London cables show the metal unchanged at £74@£74 5s. for Best Selected, and £65 10s.@£65 15s. for Chili Bars.

Tin.—We record a further weakening of the

BOSTON MINING STOCKS.

	Dec. 8.		Dec. 9.		Dec. 11.		Dec. 12.		Dec. 13.		Dec. 14.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Allouez	2.00				2.00				2.12½				300
Atlantic	16.25												350
Aztec													
Belle Isle													
Blue Hill													
Bodie Con													
Bonanza D	2.62½		3.00		2.75	2.50	2.50		2.56¼	2.37½	2.62½	2.50	2,810
Bruns. Ant													
Bulwer							1.20						100
California							.10						1,000
Cal. & Hec	250		250	249¼	250½	250	251	250½	250½		251		80
Carbon. Hill													
Catalpa	.95				.90	.87½	.87½				.87½		1,200
Central Ariz													
Cherryfield	.25		.25				.25		.25				1,200
Chrysolite													
Con. V'ginia	.70				.60		.60						800
Copp'r Falls													
Crescent			.30		.30								1,100
Cumberl'd													
Deer Isle													
Denver City													
Douglas									.95				100
Duncan													
Dunkin									.20				100
Empire	.29	.27	.27		.29	.28							2,800
Eureka Con													
Franklin	14.00		14.00								14.00		190
Gila County	.05	.03	.05		.05		.05		.05				11,650
Hancock G			9.25	9 12½	9.12½								400
Harshaw	.50												50
Horn-Silver													
Huron	2.00				2.00				2.00				240
Independ'ce													
Little Pitts									.76				200
Madison													
Mammoth													
Mass. & N.M.	.19		.19		.19		.19						7,500
Milton													
Napa	3.75		3.62½						3.50	7.43¾			550
National													
North. Belle													
Osceola	34.00	33.75			32.75	32.00	32.00		32.00				128
Penn-Breck													
Pewable	13.00	12.00	13.00				11.00		12.37		12.50		131
Pine Tree			16.00						.15				700
Plymouth													
Quincy	61.00	60.50			62.00		62.00		62.50	62.25	64.50	63.87	681
Ridge													
Robinson													
San Pedro					.25				.25		.25		1,800
Silver Islet	7.00												20
Silver King													
S'ra Nevada													
So. Pacific													
State Line Nos. 2 & 3													
Sullivan	1.25	1.12½	1.25		1.37½	1.00							1,000
Sutro Tun	.20								.20				700
Sycamore													
Twin Lead									.25	.23			1,600
Vizina													

PHILADELPHIA MINING STOCKS.

	Dec. 8.		Dec. 9.		Dec. 11.		Dec. 12.		Dec. 13.		Dec. 14.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
American													
Argent	.12	.11	.11		.11		.13	.11			.12		39,600
Arizona So.													
Aztec													
Battle Mt													
Black Sul			.03		.03		.03		.03		.03		3,500
Buena													
California													
Calista	.15								.05		.05		7,000
Cincinnati	.10								.06		.09		2,500
Comprom'e	.30	.27½	.27½		.30		.30		.32½				4,700
Dauntless	.02		.01				.01						14,000
Del Monte													
Denver City	.22		.21		.22		.22	.21	.22		.23		8,200
Fairview			.01										5,000
Eureka													
Girard	.11	.08	.12	.11	.12		.11		.12		.12		55,900
Golconda													
Golden Age					.05				.04		.04		18,600
Governor	.10		.10		.10		.10		.10				45,500
Grand Un'n													
Gunnison													
Hancock													
Intervener													
Iowa Gulch	.08		.07		.07		.08		.08		.08	.07	39,900
King Bul'on													
Little Dia'd			.05										6,000
Little Maud													
L'g & D'y Hl													
McCullough													
Magnolia													
Montana	.08		.08		.08		.08						6,138
Mt. Lincoln													
Mt.Sheridan	.04	.03									.03		4,000
National													
Orion			.09		.04		.05		.05		.09	.05	2,700
Palmetto E.													
Pembina	.22		.21		.22	.20							5,600
Penn-Breck	.13	.12	.12	.10	.12		.12		.10		.10	.09	17,700
Permanent													
Pizarro													
Pizarro Ex													
Potosi													
Rara Avis			.50		.45		.42½		.45				2,400
Rara Avis E.							.05						5,000
Record			.13		.13		.13						15,900
Rico Pion'r													
San Pedro													
Sierra G'ndie	4.20	4.10	4.15		4.80	4.65	4.70		5.05	4.80	4.90	4.65	5,300
Silver Cord	1.00	.97½			1.00		1.05	1.00					1,763
Silv'r Plume													
Silver Rock													
Sovereign													
Standard													
Sultana	.04		.05		.05		.06		.06		.06		37,500
Sutro Tun'l													
Tombstone			.87½		.90		.87½	.85	.82½		.87½		12,800
Tranquilli'y													
Tyrone													
Union Con													
Victor			.01										8,000
Yale Mt													

market, which we are informed is due to the efforts of speculators, who are endeavoring to cover on future contracts. Straits tin is quoted at 21c. with the market in buyers' favor, and Australian 21c. Arrivals during the week have been 400 tons. The larger holders are not selling. London at the close cables £93 5s.

Lead.—The market is stagnant and wholly without features of interest. There has been no business whatever. Buyers would probably not be able to do better than 4·65@4·70c. in Common, while any lots forced on the market would not fetch more than 4·50c. The lull is due entirely to the suspension of sales on the part of a large firm in Chicago, which handles the lead for two of the largest refineries in the country.

Messrs. John Wahl & Co. wire us as follows to-day from St. Louis:

The market has ruled dull, with scarcely any fresh business since our last report. Sales will not aggregate 200 tons, and 4·10c. has been refused for Hard Lead, which is nominally 4·12½c. Receipts were 600 tons, against 550 tons during the previous week.

Spelter.—This metal is dull and lifeless, ordinary Domestic being quoted at 4¾@4¾c. nominally. We refer editorially to some interesting recent developments in the metallurgy of spelter.

Antimony.—Cookson's brand is forced on the market and has declined to 11¾c. Hallett's remains unchanged at 10⅝c.

Quicksilver.—The demand is light, sales having been made at 36½c., though some are asking more.—*San Francisco Commercial Herald.*

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Dec. 15.

American Pig.—The market is quiet, and there is considerable hesitation, which by some is attributed to the delayed action of Congress. It can not be denied, however, that there is a weaker feeling not attributable to this cause. It is true that the position statistically of pig-iron remains a very good one. Stocks in the hands of makers, dealers, and consumers are pronounced lower than they have been for many years; but on the other hand, buyers insist upon concessions and have been more successful of late than hitherto. We note sales of about 2000 tons of Foundry brand and 1500 tons of Gray Forge at our quotations, which we make $ 24.[illegible] @ $26.50 for standard to choice Foundry No. 1; $22.50@$24 for No. 2; and $20.50@$21 for Gray Forge. Bessemer Pig is weak. We hear of a sale of 10,000 tons Foreign at $22.50 ex ship, taken by a Pennsylvania steel-mill, to cover requirements of a recent contract for rails. England cables 53s. 6d.@ 55s. Spiegeleisen is very dull.

Scotch Pig.—The only feature worthy of particular notice is, that small lots of the pig coming in go into store, importers preferring to hold them rather than suffer a loss. The bulk of the imports goes into consumption. Freights are still low, being wired 6s. 6d. from Glasgow to this city. The cable quotations received at the Wall Street Exchange are as follows, being a slight decline: Carnbroe, 56s.; Gartsherrie, 63s. 6d.; Summerlee, 63s.; Coltness, 67s. 6d.; Langloan, 67s.; Glengarnock, 55s. 6d.; and Eglinton, 55s. 6d. Warrants are 49s. 1½d. We quote Coltness, spot, $26.50@$27, and $26.25 to arrive; Glengarnock, $23@$23.50; Langloan, $26.50; Summerlee and Gartsherrie, $26; and Eglinton, $22@ $22.50.

Rails.—The event of the week has been the sale to the New York, West Shore & Buffalo Railroad of 40,000 tons of steel rails by the Troy and two Pennsylvania mills, at a price equal to $40, delivered. This is equivalent to about $38.50 and a little less than $39 at mill for the Pennsylvania works. We quote, therefore, $38.50@$39.50 at mill.

An impression seems to have been gaining ground, and has found expression in the columns of a prominent trade journal, that the steel rail makers are representing the condition of that industry in a darker light than it really is. They are credited with all sorts of motives. We fail to see any good cause for such assumptions. The steel producers are not, by any means, responsible for the popular misapprehension as to the condition of the iron trade. That was brought about by the fact that newspaper writers, ignorant of the relations between the iron and steel trades, jumped at the conclusion that, because the latter was in a very poor condition, the former, too, must be approaching ruin and disaster. All well-informed journals protested against this misrepresentation, and the Western Iron Association at Pittsburg has recently given the weight of its name to their view. We reaffirm that the iron trade is in a fair condition, but that does not warrant the conclusion that steel makers have been exaggerating their woes. With a comparatively moderate amount of railroad building next year, say 8000 miles, there is not even danger of over-production. The demand had been for months artificially restricted; and when the works found themselves in the novel position of not having orders booked half a year ahead, a scramble for new business resulted. Low prices brought out very heavy contracts, probably in the aggregate not less than 500,000 tons, or about three months' work, which will not, however, carry all the mills through the winter and early spring. They are now bidding for enough to keep their works employed, and lower prices of raw materials and labor permit them to make contracts at even lower figures.

Old Rails.—We hear of sales of about 3500 tons of Ts at $25, which we quote. Double Heads are nominal only.

Scrap.—We record small sales at $25.50, ex ship.

Philadelphia. Dec. 15.

Pig-Iron.—Quotations in iron have weakened some what, but there is no general decline. Sales have been made in No. 1 Foundry iron at $26 for standard brands; inferior brands have sold down to and below $25. No. 2 Foundry iron is weak, and has been as low as $23, while better brands bring $23.50@$24; a few furnaces are refusing to sell at these low figures, preferring to stock up and wait for developments. Consumers of Gray Forge are acting with considerable caution in view of the uncertainties surrounding the iron trade. Two or three large transactions have been closed, but the bulk of the business is confined to small lots for January delivery. Among some careful, thinking men, the opinion prevails that prices may take an upward tendency after the holidays, but the general belief inclines in an opposite direction. Large sales of Bessemer Pig have been made at $22, and the tendency is downward; cable information from the other side shows a weakness, and buyers are negotiating for stocks sufficient to make themselves safe for some months to come.

Manufactured Iron.—Only small lots are called for, and quotations run from 2·30@2·50c., according to quality and size of order; stores are selling in a small way from 2·50@2·60c., and find a steady demand from consumers, who are unwilling to take any risks. Consumption is large, and, as far as man-

ufacturers and brokers are able to tell, will continue steady throughout the winter. A meeting of manufacturers will take place in this city next week, to take into consideration the proposed reduction, to discuss the duties, and, if possible, make some sort of protest against them, should it be deemed a wise step. The low duties are not acceptable; but it is doubtful whether any serious opposition will be made to the acceptance of the report as a whole. The pig-iron men are more or less dissatisfied because of the reduction in duties of 25 per cent below what they had desired.

Nails.—Large shipments of nails are taking place on old contracts, and a few good-sized orders have been taken for winter delivery at concessions from present card rates. Meetings have been held within a day or so, although East and West the trade is reported in excellent condition.

Sheet-Iron.—The manufacturers of sheet-iron report a more active year in 1882 than before in the history of the iron trade, and show books with orders on hand for delivery two to three months to come. Their capacity is by no means over-sold, but the consumption is very heavy, and it is quite probable that the output will be absorbed as promptly as it has been during the last few months.

Plate and Tank.—Sales will foot up five thousand tons; it is impossible to give exact quotations; Tank, 2·75c. Several inquiries are in hand, and manufacturers are not willing to take any more business than to secure themselves until better prices can be had.

Structural Shapes.—A few small orders are in hand. Specifications are received for future consideration. The market is much broken up, and extremely low prices have prevailed in consequence. Tees, 3·50c.; Beams, 4c.; Channels, 4c.

Steel Rails.—The companies at present are reticent as to transactions and prices, but negotiations for large lots have been in hand. The business during the past few days is of some magnitude. Quotations are $40, and some of the business under consideration is at lower figures. As low as $38 has been rumored as the selling price, but it is doubtful whether contracts have been accepted at these figures.

Old Rails—Are quoted at $27@$27.50; Double Heads, $29@$30. Sales have been made below these figures, and buyers will not make purchases except at more favorable terms.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Dec. 15.

Anthracite.

The anthracite coal trade is in an unsettled condition, buyers holding off, while some sellers are making concessions to move the coal. As matters are now shaping, nothing but a prompt decision on the part of the producers to order half-time for January, and, if that does not help, for February also, can aid the trade. To stop during holiday week will not suffice; nor are such measures as that taken by the Reading Company, of ordering three quarters time, able to meet the case. The output is little affected by such a reduction of time. Buyers have caught up the idea that prices must weaken considerably in the near future, and the events of the last week seem to bear them out in that view. Only such steps as we have alluded to can convince them that producers propose to keep the trade well supplied.

The production of anthracite coal for the week ended December 9th was 675,548 tons, as compared with 628,372 tons the previous week, and 615,708 tons the corresponding week of 1880. The total production from January 1st to December 9th was 27,656,211 tons, as against 26,695,916 tons for the like period of last year, showing an increase this year of 960,295 tons.

Bituminous.

The condition of the trade has changed very little. The demand is fair and prices are firm, the producers showing no particular anxiety to market their coal. It is stated that 150 boats have been caught in the Raritan Canal, and it is a question whether they can be got through. Clearfield shippers are still buying Cumberland coal, which is selling at $4.75@$4.95, according to quality.

BULLION MARKET.

NEW YORK, Friday Evening, Dec. 15.

The silver market abroad, in the absence of any special demand, has yielded to the pressure of the increasing amount of bills offered weekly by the Indian Council. As there are still above seven million sterling (£7,000,000) to be drawn for in the remaining four months of the fiscal year, the prospect for an improvement in silver is by no means good. Under a moderate order from Spain, the price advanced a little in London to-day, but exchange on India is reported weaker.

DATE.	London	N. Y.	DATE.	London	N. Y
	Pence.	Cents.		Pence.	Cents
Dec. 9....	50 11-16	109¼	Dec. 13.....	50⅝	*
Dec. 11....	50⅝	109¼	Dec. 14.....	50¼	108⅜
Dec. 12....	50½	109	Dec. 15.....	50⅜	108⅝

*108¾@108½.

BULLION PRODUCTION FOR 1882.

MINES	States.	For the week.	Month of November.	Year from Jan. 1st, 1882.
*Alice, G. S.	Mont.			$712,791
*Alta-Montana, G. S. L.	"			343,290
Barbee & Walker, S.	Utah		$6,295	84,262
*Belmont	Mont.			24,555
Betty O'Neal, S.	Nev.			59,159
*Black Bear, G.	Cal.			69,015
Bodie, G. S.	"	$8,558	54,215	401,539
*Boston & Montana, G.	Mont.			240,442
*Caledonia, G.	Dak.			76,655
*Caribou, S.	Colo.			126,918
*Central Arizona, S.	Ariz.			161,660
*Christy, S.	Utah			295,164
*Chrysolite, S. L.	Colo.			285,688
Cons. Bobtail, G.	"			99,784
*Contention, S.	Ariz.		142,227	1,692,604
Crismon-Mammoth, G.	Utah			63,579
*Custer, G. S.	Idaho		39,714	682,331
*Deadwood-Terra, G.	Dak.			551,052
*Derbec Blue Grav., G.	Cal.			128,157
*Eureka Con., G. S. L.	Nev.		70,887	903,538
Evening Star, S. L.	Colo.			862,520
*Father de Smet, G.	Dak.		13,319	348,106
*Frisco M. & S. Co., S. L	Utah			318,599
Girard, S.	Ariz.			90,964
Grand Central, S.	"			905,000
*Hall Anderson, G.	N. S.			12,033
*Head Center, S.	Ariz.		15,030	145,636
*Hecla, G. S. L.	Mont.			77,945
*Homestake, G.	Dak.		130,000	1,114,568
Horn-Silver, S. L.	Utah	67,500	323,750	3,312,516
*Hope, S.	Mont.		33,323	304,067
Idaho, G.	Cal.			395,540
*Independence, S.	Nev.	4,000	27,396	115,234
*Indian Queen, S.	"		22,000	183,650
*Inyo Cons., G.	Cal.			59,421
Ingersoll, S.	Ariz.			90,000
Iron Silver, S.	Colo.			865,436
*Jocuistita, S.	Mex.			700,585
*Kentuck	Nev.			2,175
*†Leeds, S.	Utah			11,988
Lexington, S.	Mont.			88,508
*Little Pittsburg, S. L.	Colo.		6,914	134,538
Manhattan, S.	Nev.			64,300
Morning Star, S. L.	Colo.			478,646
Mount Diablo, S. L.	Nev.			294,397
*Navajo, G. S.	"		64,018	127,880
New York Hill, G.	Cal.			105,136
Noonday, G.	"			67,818
North Noonday, G.	"			83,456
Northern Belle, S.	Nev.	10,300	60,497	719,211
*‡Ontario, S. L.	Utah		168,455	2,221,303
Ophir, G. S.	Nev.			39,472
*Oxford, G.	N. S.			15,564
Pascoe, S.	Utah			4,375
*Pleasant Valley, G. S.	Cal.			40,044
Robert E. Lee, S.	Colo.			292,550
*Satemo, G.	N. S.		2,200	11,095
Savage, S.	Nev.			3,500
*Silver Bow, G. S.	Mont.			278,693
Silver King, S.	Ariz.		81,365	711,405
*Spring Valley, G.	Cal.			152,000
Standard, G.	"	31,391	136,628	1,072,565
Star, S.	Nev.	1,157	6,105	58,358
Stormont, S.	Utah	6,680	14,770	270,924
Syndicate, G.	Cal.		8,580	38,509
Tintic M. & M. Co.	Utah	3,000	9,266	50,873
*Tip Top, S.	Ariz.			191,034
*Tombstone, G. S.	"		78,251	889,896
*Union Con., S.	Nev.			318,291
Vizina, S.	Ariz.			165,200
Total amount of shipments to date				$25,907,887

* Official. † Net. ‡ Assay value. *G. Gold. S. Silver. L. Lead.*

Bullion Receipts at New York.—The bullion received from the mines at the various offices in this city during the week ended December 15th, as compiled from various sources, amounted to $502,960.14, as against $339,889.14 reported for the previous week. The receipts from January 1st, 1882, to date, are $13,398,087.31.

Exports and Imports of Gold and Silver at New York.

Exports.

Week ended December 9th	$216,612
Corresponding week last year	153,560
Since January 1st, 1882	45,387,112
Corresponding period last year	10,614,962

Imports.

Week ended December 9th	$368,433
Corresponding week last year	285,638
Since January 1st, 1882	6,605,992
Corresponding period last year	54,643,360

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate for discount, and it remains at 5 per cent. During the week, the bank lost £28,000 bullion, but the proportion of its reserve to its liabilities was raised from 40 5-16 to 41⅛ per cent, against 39⅞ per cent at this date a year ago. The weekly statement of the Bank of France shows a specie loss of 2,075,000 francs gold, and 1,875,000 francs silver.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended December 9th, and years from January 1st:

TONS OF 2240 LBS.	1882.		1881.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co.	77,736	3,414,709	75,159	3,422,461
D. L. & W. RR. Co.	97,857	4,323,094	92,826	4,073,479
Penna. Coal Co.	34,104	1,362,246	29,909	1,349,474
L. V. RR. Co.	28,412	1,024,823	20,324	1,106,831
P. & N. Y. RR. Co.	8,084	187,363	2,975	99,562
C. RR. of N. J.	49,223	2,151,628	51,811	2,169,966
Penna. Canal Co.	23,500	507,526	2,933	457,260
	318,916	12,971,359	275,937	12,679,033
Lehigh Region.				
L. V. RR. Co.	139,490	4,621,036	106,524	4,303,945
C. RR. of N. J.	49,940	2,128,082	82,122	2,084,912
S. H. & W. B. RR.		51,041		10,926
	189,430	6,800,159	188,646	6,399,783
Schuylkill Region.				
P. & R. RR. Co.	145,010	6,645,358	149,801	6,628,139
Shamokin & Lykens Val.	20,609	1,178,819		927,260
	165,619	7,824,177	149,801	7,555,399
Sullivan Region.				
St Line & Sul. RR. Co.	1,583	60,516	1,324	61,701
Total	675,548	27,656,211	615,708	26,695,916
Increase	59,840	960,295		
Decrease				

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Total same time in 1877	19,296,441 tons.
" " " " 1878	16,486,088 "
" " " " 1879	25,023,416 "
" " " " 1880	22,388,866 "

The decrease in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 879,270 tons, as compared with the corresponding period in 1881.

Belvidere-Delaware Railroad Report for the week ended December 9th:

	Week.	Year. 1882.	Year. 1881.
Coal for shipment at Coal Port (Trenton)	3,740	104,137	81,167
Coal for shipment at South Amboy	19,069	792,782	709,026
Coal for distribution	21,084	716,415	686,696
Coal for company's use	2,097	122,969	107,981
Total	45,990	1,736,303	1,584,870
Increase		151,433	
Decrease			

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The Board of Trustees have this day declared a dividend, No. 9, of
TWENTY CENTS PER SHARE,
payable at this office on Tuesday, December 26th, 1882. Transfer-books will be closed at three o'clock P.M., Saturday, December 16th, and reopened on Thursday, December 28th.
JACOB HOUGHTON, Secretary.

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